

JPRS 76207

12 August 1980

# **USSR Report**

**ECONOMIC AFFAIRS**

**No. 935**



**FOREIGN BROADCAST INFORMATION SERVICE**

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**CONTENTS**

**ECONOMIC POLICY, ORGANIZATION, AND MANAGEMENT**

Evaluating Influence of Balance and Proportionality  
on Production  
(V. D. Belkin, V. V. Ivanter; EKONOMIKA  
I MATEMATICHESKIYE METODY, Mar-Apr 80) ..... 1

Plyshevskiy Discusses Proportionality Concept  
(B. Plyshevskiy; PLANOVOYE KHOZYAYSTVO, May 80) .... 19

**PLANNING AND PLAN IMPLEMENTATION**

Incorporating Annual Plans Into Five-Year Planning  
(P. Krylov; PLANOVOYE KHOZYAYSTVO, Jun 80) ..... 32

**INTRODUCTION OF NEW TECHNOLOGY**

Academician Discusses Management of Technology  
(V. Glushkov; PLANOVOYE KHOZYAYSTVO, Jun 80) ..... 43

## ECONOMIC POLICY, ORGANIZATION, AND MANAGEMENT

### EVALUATING INFLUENCE OF BALANCE AND PROPORTIONALITY ON PRODUCTION

Moscow EKONOMIKA I MATEMATICHESKIYE METODY in Russian No 2, Mar-Apr 80 pp 231-244

[Article by V. D. Belkin and V. V. Ivanter: "Methods of Evaluating the Influence of Balance and Proportionality on the Efficiency of Social Production"]

[Text] With the development and increased complexity of social production the role of balance in the socialist economy is increasing as never before. In the Summary Report of the CC CPSU to the 25th CPSU Congress it was stated: "...for a number of positions somewhat lower growth rates have been envisaged than existed in the Ninth Five-Year Plan. What is the explanation for this?...the most important thing is that we have tried in this five-year plan to ensure greater balance and proportionality in the development of the economy...." ("Materials of the 25th CPSU Congress," Moscow, 1976, p. 44)

The decree of the CC CPSU "On a Further Improvement of the Economic Mechanism and on the Tasks of Party and State Agencies" which was adopted in July 1979 emphasizes the paramount importance of ensuring the balance of plans. (1, p. 4) The decree of the CC CPSU and USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and the Quality of Work" charges "Gosplan USSR...to develop a draft of the state five-year plan for the economic and social development of the USSR (with a distribution of assignments by years) which is balanced for all indicators." (1, p. 10) In the same place it is stated: "To regard it as necessary to increase the responsibility of Gosplan USSR and of the USSR ministries and departments for the balanced nature of assignments of the state plans for the economic and social development of the USSR." (1, p. 23)

In the economy of mature socialism balance and proportionality exercise an increasing influence on the efficiency of social production. Meanwhile, with the existing methods of measuring efficiency, the influence

of these factors is not properly calculated. In the present article methods which take a fuller account of them are proposed.

In accordance with the 12 July 1979 decree of the CC CPSU and USSR Council of Ministers, the development for each year of the five-year plan of balances of material and labor resources, production capacities, and of the financial and monetary income and expenditures of the population is assumed. Thus, a plan is supposed to provide for a balance between the following: the production of output and its use for production and non-production consumption and accumulations; accumulations and capital investments; capital investments and capacities; capacities, labor resources, and output; monetary income and its material coverage; and the needs for imported output and the exports which provide the necessary currency for this.

Balance also has temporal characteristics; that is, the interval during which it is achieved. Indeed, it is one thing when production and non-production needs are satisfied on time, and another when they are satisfied belatedly. The degree of lateness is also important. Lateness in supplying raw materials and materials slows down the process of production, disturbs its rhythm, and lowers the amount and quality of the output being produced, while lateness in satisfying needs of a non-production character lowers the level of public welfare and has a negative effect upon the stimulating role of wages.

The content of proportionality is also very multiform. The proportions between types of production and non-production output may be different. In the same way, the structure of production capacities and the vocational and skills composition of labor resources differ.

Let us see to what extent the above-enumerated aspects of the balance and proportionality of social production are reflected in the economic efficiency indicator being used at the present time. As is known, the relationship of national income or of the integral consumption fund S to expenditures or resources R is used as the most widespread economic efficiency indicator 3

$$3 = \frac{S}{R}. \quad (1)$$

The supporters of representing national income as a whole in the numerator (1) take the position that it is necessary to take account, in addition to the consumption fund and the accumulations fund, of expanded reproduction as a necessary condition. The opponents believe that the integral consumption fund should be in the numerator (1) and point to the important and ever growing role of the sphere of services in

satisfying social needs. The arguments of both sides are quite justified and, for this reason, in our view, the numerator (1) should contain national income with the addition of services -- of course in monetary terms, or, in other words, national income in its expanded interpretation. As for the denominator (1) in view of the urgent need for a better use of our accumulated economic potential, in our view, the representation in it not of expenditures, but of resources is more valid. The supporters of this kind of approach believe that sufficiently full account is taken of expenditures here, for they are reflected in the magnitude of the numerator thereby lowering the national income indicator and, correspondingly, efficiency. For this reason the Corresponding Member of the USSR Academy of Sciences A. I. Notkin rightly calls the formula (1) a resource-expenditure formula. (2)

The indicator 3 as computed for (1) has unquestionable virtues and advantages compared to other efficiency indicators. However, the influence of a number of the above-enumerated aspects of balance and proportionality is insufficiently reflected in the magnitude 3 , while certain aspects and, moreover, very important ones are not taken account of at all. The indicator 3 gives the fullest expression to the balance and proportionality of the material goods and production services consumed in current (annual) production; to the period of time during which balance is ensured in it; and to the structure of the capacities and the composition of the labor resources used here. Balance and proportionality are conditioned here by very rigid demands of a production organization character.

Of course, both production consumption (so-called intermediate output) and the use of capacities and labor resources are within certain limits variable. Different types of fuel (petroleum, gas, and coal) and construction materials (metal, ferroconcrete, wood, plastic) are within the limits of certain groups interchangeable. There is also a certain interchangeability between groups. For example, less fuel is needed to heat insulated buildings (the interchangeability of fuel and construction materials). The same capacities and labor resources may be used to produce different kinds of output. But one or another technology, the consumption of one or another resource, and disproportions in the production of different types of raw materials and materials and in the relationships between different types of equipment and in the vocational and skills composition of labor power find a direct reflection in the indicators of the results of production (and national income) and of resources and, consequently, in efficiency. A deviation in the structure of the intermediate product and in production resources from the optimum reduces the efficiency indicator which is calculated in accordance with (1). On the contrary, the approximation of these structures to the optimum increases it.

The situation is different with the balance and proportionality of final output which is designed for non-production consumption and capital investments. A lack of balance and disproportions in final output and also the temporal characteristics which are related to this field do not have an influence on the indicator 3 . Although the output of fund-forming branches for subsequent use within capital investments must be produced in definite proportions, a violation of these proportions does not influence the amount of national income which is obtained in a given year and, consequently, the 3 indicator for this year. A lack of balance and disproportions in this field will have an influence in the future and will find a reflection in the efficiency indicators of subsequent years and, consequently, in its dynamics.

As for the balance and proportionality of non-production consumption, these factors and its dynamics are not at all reflected by the 3 indicator. Yet, if the problem of efficiency is regarded from the point of view of the demands of the basic economic law of socialism and if an increase in welfare is seen as its chief criterion, the balance and proportionality of non-production final output have to be expressed by the corresponding indicators to no less an extent than the intermediate output which is used for production consumption, that is, material expenditures.

In the 12 July 1979 decree of the CC CPSU it is directly stated that the Central Committee "...in accordance with the positions of the 25th Congress regards it as necessary to direct all managerial and planning work even more strongly toward an increase in production efficiency and in the quality of work, toward the attainment of high final economic results, and toward a fuller satisfaction of our growing social and personal needs." (1, pg. 4)

The balance and proportionality of final output are measured by the degree of its correspondence to the amount and structure of effective demand which is defined by the final monetary income of the population, enterprises, kolkhozes, and institutions of the non-production sphere. The temporal characterization of balance and proportionality is expressed not only by the amount of produced national income and resources which figure in (1) but also by the financial state of the economy and the dimensions and direction of changes in its indebtedness -- both domestic and foreign. If effective demand in a given year exceeds the amount of goods and services in monetary terms which are designated to cover it, the population's savings increase and the remainders of monies in the accounts of enterprises and kolkhozes grow. An increase in postponed effective demand and, correspondingly, in savings in excess of the normal level (a clearly undesirable phenomenon which is the result of a lack of balance in time) does not find a reflection either in the

enumerator or in the denominator (1). Similarly, an increase (decrease) in foreign indebtedness does not find a reflection in the  $\eta$  indicator, although with expanded foreign economic relations this problem has become important.

The proportionality of final output is not taken account of in (1). Without the opportunity to use its income to acquire output in a desired assortment, the population, enterprises, kolkhozes, and budget organizations are compelled to consume some output in accordance with a structure which is determined by supply. However, an economy is the more efficient the greater demand is balanced with supply, for in this case with the same amount of national income social needs for goods and services are more fully satisfied. The 12 July 1979 decree of the CC CPSU defines the necessity for "taking fuller account of the interests of consumers when production assignments are formed." (1, pg. 4)

It follows from what has been said that in order to more accurately measure the efficiency of social production with the influence of balance and proportionality taken into account the  $\eta$  indicator has to be corrected. Let us briefly consider the information support which is necessary for this. Just as in the calculation of the efficiency indicator in accordance with (1), the balance of the economy has to serve as the information base here, but a balance which is made up in accordance with an improved scheme and supplemented by a system of financial balances. (3) During the reporting period such balances could be constructed on the basis of the existing statistical and financial materials.

The 12 July 1979 decree of the CC CPSU and USSR Council of Ministers provides for Gosplan USSR to work out a summary financial balance with a distribution of income and expenditures by years, and for there to be a summary financial plan within the annual plan which corresponds to the latter. The Ministry of Finance has to prepare summary calculations (for the basic indicators) of the income and expenditures of the state budget for the five-year plan (with a distribution by years). Gosbank and Stroybank USSR will perform calculations of long-term and short-term credit for a five-year period (with an annual distribution). Simultaneously with the draft of the five-year plan, the ministries and departments have to compose five-year (with an annual distribution) plans, and also annual financial plans. Corresponding financial plans have to be worked out for production associations (enterprises). Gosplan is given the duty of working out within the five-year plan a balance of the monetary income and expenditures of the population with a distribution by years, and in the annual plan -- an annual balance. (1, pg. 28)

Efficiency indicators for a future period may be calculated on a basis of balances of economy which are computed in accordance with "income-goods" models which include for each year of the planning (forecasted)

period balances of the income and expenditures of the population, cost accounting enterprises, budget organizations, and kolkhozes and the foreign trade, payment, and summary financial balances of the state. The expenditure part of these balances contains information which is necessary to take account of the influence of the balance and proportionality on an evaluation of the efficiency of social production. The desirable and possible structure of backing up effective demand and a normal and forced increase in savings are shown in the balance of the population's income and expenditures. The expenditure part of the other financial balances is subdivided in a similar manner.

Let us now examine methods of calculating the influence of the balance and proportionality of final output upon the indicator of the efficiency of social production. This influence can be reflected with the help of the coefficients  $a_1, a_2, a_3, a_4$ , which characterize the degree of agreement between effective demand and its support for the population, enterprises, kolkhozes, and budget organizations. The corrected indicator of the efficiency of social production is then

$$S_i^* = \frac{a_1 S_1 + a_2 S_2 + a_3 S_3 + a_4 S_4}{R} = \frac{S^*}{R}, \quad (2)$$

Where  $S_1, S_2, S_3, S_4$  -- are parts of the national income (with the addition of services) for the population, enterprises, kolkhozes, and budget organizations;  $S^*$  -- is the amount of national income corrected in connection with a lack of balance between the structure of effective demand and its material coverage. The following statement by A. N. Kosygin testifies to the necessity for this kind of correction of the part of the national income which is designated for the population ( $S_1$ ): "Frequently goods are delivered to retail trade which do not correspond to the population's demand. At the same time, the plans of the enterprises which have produced these unsaleable goods are regarded as fulfilled and their workers receive bonuses." (A. N. Kosygin, "An Important Stage in Improving the Planned Management of the Economy," KOMMUNIST, No. 12, 1979, p. 20) Let us note that according to the existing statistical methodology, the total price of such kinds of goods (together with bonuses) which the population has been compelled to purchase due to the lack of goods of the desired quality and assortment in sales is included in full in the amount of utilized national income -- in the consumption fund.

In order to approach a quantitative determination of the coefficients it is necessary first to estimate the interval within which their numerical values are located. The maximum possible value of a is 1, and its minimum value can be established as a portion of the total

amount of the material coverage for effective demand which has been satisfied in keeping with the assortment necessary to consumers.

What has been said can be explained through the following conventional example (see the table). Let us assume that the consumption fund consists of two products:  $q_1$  and  $q_2$ .

1. Платежеспособный спрос и его покрытие

2. Индекс продукта	3. Желаемый спрос, млрд. руб.	4. Фактически удовлетворенный спрос, млрд. руб.	5. Удовлетворенный желаемый спрос	6. млрд. руб.	7.
$q_1$	80	110	80	100	
$q_2$	120	90	90	75	
7. Всего	200	200	170	85	

Key:

1. Effective demand and its coverage;
2. Product Index;
3. Desire demand, Billions of Rubles;
4. Actually satisfied demand, Billions of Rubles;
5. Satisfied desired demand;
6. Billions of rubles;
7. Total

Satisfied desired demand for output proved to be 30 billion rubles lower than actually satisfied demand. In the case being examined the coefficient a will come to .85. In a calculation of the economic efficiency of social production the result of production -- national income or another similar indicator -- will, in this way, be decreased by 30 billion rubles, which is equivalent to a zero evaluation of that part of the product  $q_1$  which has been produced in excess of desired demand. In reality, this part of the product  $q_1$  has a non-zero positive evaluation. The question arises: how is that part of the product which has been produced in an amount exceeding desired effective demand to be evaluated? As is shown in the third volume of "Capital" for goods whose production compared to effective demand is loss-bearing the price deviates downward from social production costs.

Thus, in order to calculate the indicators of economic efficiency according to the proposed formula (2) the structure of effective demand has to be determined on the basis of prices which express the social

costs of production (with the exception, of course, of such goods as alcoholic drinks and tobacco products whose high prices are established on the basis of social considerations). Let us note that from this point of view the degree of the satisfaction of the effective demand for certain goods is understated when it is measured in the prices in effect. Let us say that the prices for meat and dairy products are substantially lower than the costs of production, which is witnessed by the annual subsidy for these products from the state budget on the order of 20 billion rubles. (4) As the result of the elasticity of effective demand with regard to prices, it is, correspondingly, artificially expanded.

On the basis of what has been said a computation of the coefficient  $a$  can be performed in the following way. The total price of goods has to be taken in the amount of total effective demand; within its limits the levels of production prices are calculated. Further, in view of the desired structure of effective demands and the real possibilities of covering it, for certain goods upward and downward deviations from their production prices are established. The total downward deviations will serve as an indicator of a decrease in efficiency resulting from the unbalanced nature of the structure of effective demand and its coverage. The coefficient  $a$  in (2) must, therefore, be calculated on the basis of the production prices for goods whose supply accords with effective demand or is lower than it, and on the basis of prices which, correspondingly, have been lowered for goods whose supply exceeds this demand.

Let us now go to an evaluation of the influence of a change in the population's savings on the efficiency indicator. An increase in savings means that the part of resources which has been designated for the production of consumer goods has been directed toward other purposes; for example, for an expansion or reequipping of the production apparatus. This will lead to an increase in national income in a given year (or in the future) and, this means, to an increase in efficiency. But, as a result of an increase in indebtedness, this kind of growth is possible, first, when monetary turnover (both cash and non-cash), including indebtedness, completely corresponds to the turnover of material goods and services both of a production and a non-production character, and, secondly, on the condition that the monetary means which have been formed as a consequence of an increase in indebtedness have been directed toward production consumption.

As is known, savings can be subdivided into normal and forced savings. With a normal level of savings there is an increase in the stable remnant of investments which, in effect, is income for the state, and in subsequent years these savings do not increase effective demand. The situation is different with forced saving; that is, the income of

the population which in a given year has not found material coverage. Such savings are presented for payment in future years and are included in effective demand and in this way a certain part of future resources has to be directed for the repayment of the indebtedness of past years.

There are only two possible variants of providing material coverage for additional effective demand; 1.) To accumulate the needed stocks of consumer goods; 2.) to reorient production toward the production of the output needed to cover this demand. With the first variant production accumulations decrease in the accumulations fund of past years as a result in an increase in non-production accumulations and, consequently, there is a smaller growth of production resources and, therefore, of national income. With the second variant production accumulations will decrease in the year that the indebtedness is repaid and will lead to a decrease in production resources and, correspondingly, of effect in future years. A decrease in national income or resources is being examined here only compared to an economic situation in which material coverage for the indebtedness of past years is not provided for. In any case, whichever method is used to achieve the process of a material coverage of forced savings, it gives rise, other conditions being equal, to a decrease in the amount of production-purpose resources and, as a result of this, in the growth rates of national income.\*

To what has been said above it could be objected: since a decline in national income is accompanied by a decrease in the amount of resources for production use, the efficiency indicator computed in accordance with (1) will not decrease. With a slower decrease in national income compared to the amount of resources the efficiency indicator may even increase. Indeed, insofar as the amounts of national income and resources are measured against one another in (1), then, if the economically valid limits of the use of this formula are disregarded, the result is that an increase in efficiency is seemingly equally possible both on the basis of an increase in national income and as a consequence of a decrease in the amount of resources which are used in social production.

If one were to hypothetically imagine an economic situation in which only the most technically perfected capital participates in production, the most qualified labor power is drawn into it, production is organized in climatically favorable areas, and only high quality and easily accessible

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\*The questions of repaying indebtedness by means of increasing prices, devaluations, the conversion of loans, and similar measures are not considered here, although in exceptional cases such measures have been used.

natural resources are used, then efficiency measured as the relationship of the amount of national income produced under these conditions to resources will be very high. However, this would restrict the dimensions of reproduction, would mean an absolute decrease in national income, consumption, and accumulations, the appearance of unemployment and so forth, and would lead to consequences which in principle are unacceptable for a socialist society, for in the final analysis the basic criterion of the efficiency of socialist reproduction is an improvement of the wellbeing of the workers.

Thus, calculations in accordance with formula (1) have economic meaning only on condition that there is a growth in national income. A decrease in its absolute amount is already in and of itself testimony to inefficiency. And it would be incorrect to operate here with this formula.

Economic influence on an increase in national income by means of indebtedness by the population to the state is contrary to the role of savings. Bank loans and monies obtained to purchase goods on time are added to effective demand and lead to a decrease in the amount of resources for production use. On the contrary, in the future payments by the population to the state for bank loans and for goods bought on credit are deducted from the effective demand of future years and in this way the amount of resources for production proves to be greater.

The balance of the population's savings and of its indebtedness to the state represents a "domestic debt" to the population. The amount of the population's indebtedness to the state is at the present time much smaller than the amount of its savings. Thus, while at the end of 1978 the population's deposits in the savings banks and in the state bank was 131.3 billion rubles, the remainders on loans by Stroybank to housing construction cooperatives and on long-term loans by Gosbank to the population came to only 3.9 billion rubles at the same period. (5, pp. 415, 528) Although these figures do not fully reflect the domestic debt, since they do not include the population's cash money and its indebtedness on goods bought on credit, they nevertheless characterize the order of the amount of the domestic debt. Hence the balance -- the domestic debt -- is a positive magnitude.

The increase in efficiency connected with an increase in savings, which was discussed above, is shown in (1), but the decline in it in the future resulting from the payment of indebtedness does not find a reflection in (1). The repayment of debts represents the financial consequences of an increase or decrease in the domestic debt. For a normal level of savings they are the future payment of interest on deposits, and for forced savings which will lead to an increase in effective demand

in the future the financial consequences represent the full amount of savings including interest. These same consequences for the population's debt to the state consists of the amount of future payments for loans and for goods and services purchased on credit and of the payment of interest.

In order to reflect changes in the "domestic debt" in (1) it is necessary to put future payments on forced savings and the population's indebtedness to the state in a form which is commensurate with the national income and resources of a given year. In calculating the efficiency of capital investments and of new equipment expenditures made at different times and results are adduced to a current moment with the help of discontinuity coefficients  $\alpha$ . A similar method can be employed for adducing forthcoming payments. They must first be recalculated to include the interest which has been established for savings and loans, and then, with the use of  $\alpha$  the indebtedness which is to be repaid within 1 years has to be adduced to the year for which the economic efficiency is being calculated.

Thus, in connection with an increase in the domestic debt to the population, the traditional formula for the efficiency of social production (1) is corrected:

$$\beta_1' = \frac{S - D_1'}{R}, \quad D_1' = D_1^* \beta_1 + D_1^* \left( \frac{1 + \beta_1}{1 + \alpha_1} \right)^{l_1'} - D_1^* \left( \frac{1 + \beta_1}{1 + \alpha_1} \right)^{l_1^*}. \quad (3)$$

or

$$\beta_1' = 3(1 - k_1), \quad k_1 = \frac{D_1'}{S}.$$

Where  $\beta_1'$  -- is the economic efficiency of social production, including the influence of an increase in the domestic debt to the population;

$D_1'$  -- is the amount of the population's savings;  $D_1^*$  -- is the amount of the increase in forced savings;  $D_1^*$  -- is the amount of the increase in the population's indebtedness to the state;  $\beta_1^*, \beta_1'$  -- is the interest on the savings and loans (for the population's savings in cash monies  $B_1$  equals 0);  $\alpha_1$  -- is the discontinuity coefficient;  $l_1^*, l_1'$  -- is the average repayment periods on an increase in forced savings and an increase in loans;  $D_1^*$  -- is the increase in the domestic debt adduced to the calculation year.

The necessity for planning repayment periods for the population's forced savings springs from serious social and economic causes. The population's income can with a certain degree of conditionality be divided into two parts. One of them has a purely social significance and the amount of the income in it does not have a material effect upon an increase in labor productivity and, therefore, on economic efficiency. Such income

as old age and disability pensions, stipends, various benefits, and similar payments to the population do not directly influence efficiency (although they do have an indirect influence: stipends stimulate vocational orientations, and the age quota and other pension terms effect the level of employment). At the same time, this income, as a rule, has a corresponding material coverage, or it participates in the formation of a normal level of savings. But the basic mass of savings and, especially, of forced savings is formed on the basis of wages and bonuses; that is, that part of the population's income which plays a stimulating role in the economy. The level of material coverage for this part of income has a direct relationship to the efficiency of economic management.

An increase in wages stimulates an increase in productivity. But if a part of these wages does not find material coverage, then the actual rewards for labor become lower than nominal and, moreover, the latter during the course of a specific amount of time is capable of fulfilling the same functions as actual rewards. For a certain period of time it is possible on the basis of the difference between the nominal and actual payment for labor to obtain an increase in efficiency by means of switching a part of resources to production needs. But then in order to maintain labor productivity and, especially to stimulate an increase in it, actual payment has to become greater than nominal payment as a result of material coverage for the postponed demand of previous years\*; for this reason, the state has to optimize the repayment period for above-normal indebtedness to the population.

The discontinuity coefficients which are designed for calculating the effectiveness of capital investments can be used in reevaluating the population's savings; but in this case they should be refined in connection with forecasted changes in the structure of demand and the dynamics of prices.

Material coverage for forced savings requires various amounts of resources depending upon the structure of the demand which is engendered by these savings. If, for example, forced savings have formed as a result of an unsatisfied demand for meat and dairy output, this does not mean that their material coverage will necessarily become this output. The differences in the labor intensiveness and capital intensiveness of the output which is used to cover unsatisfied demand engender, in their turn, various amounts and structures of the resources which are needed for the production of the goods and services which serve as the material coverage for forced savings. In exactly the same way, differences in

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\* I. S. Malyshev wrote about this in his time: "The lack of material coverage for the population's monetary income signifies a weakening of material stimulation and, along with other negative consequences, inevitably leads to a decrease in the rates of productivity." (6)

price levels and in their structures engender different financial results. It is very important which output is the material coverage for savings: output with a high level of profitability and a turnover tax, or output whose production has a low profitability or even requires subsidies. In the first case there will be an increase in financial resources, while in the second additional expenditures of these resources are necessary.

The future balances of the population's monetary income and expenditures whose development, as has been stated, is stipulated by the 12 July 1979 decree of the CC CPSU and USSR Council of Ministers should be an important instrument in solving the above problems of ensuring a balance between the population's effective demand and material coverage.

Let us examine the influence of the financial results of the relationships between state and cost accounting enterprises and kolkhozes and the state on the efficiency of social production. An increase in monies in the accounts of enterprises and kolkhozes which participate through the banking system in the financing of production and non-production consumption means a redistribution of resources which increases or decreases the amount of national income depending upon the goals and purposes of these monies and their actual use. Thus, for example, monies which are designated for production consumption can, as a result of redistribution, go for non-production consumption, which will decrease national income, or, on the contrary, a part of the monies of incentive funds for non-production consumption can be assigned for production needs; this, other conditions being equal, will increase national income.

The uncovered monies of enterprises, organizations, and kolkhozes have to find material coverage in the future. Therefore, the efficiency formula has to be corrected in connection with an increase in the monies of cost accounting enterprises and kolkhozes in the same way as was done for the population's savings. It should, however, be kept in mind that Gosbank does not pay interest on the monies (deposits) of state enterprises (in contrast to the population and kolkhozes). Thus,

$$\Omega_i' = \frac{S - D_i'}{R}, \quad D_i' = D^* \frac{1}{(1 + \alpha_1)^{t_1}} + D^* \left( \frac{1 + \beta_1}{1 + \alpha_1} \right)^{t_1}, \quad (4)$$

or

$$\Omega_i' = \Omega (1 - k_i), \quad k_i = \frac{D_i'}{S}.$$

Where  $\Omega_i'$  -- is the economic efficiency of social production, including the influence of an increase in the state's indebtedness to cost accounting enterprises and kolkhozes;  $D_i'$  -- is an increase in indebtedness adduced to the current year;  $D^*$ ,  $D^*$  -- is an increase in indebtedness for enterprises and kolkhozes;  $\Omega$  -- is the interest on the monies of kolkhozes;  $\alpha_1$  -- is

discontinuity coefficient;  $\bar{z}$  -- is the average repayment period of indebtedness on the material coverage for monies.

Of course, when we are speaking about state enterprises the possibility exists of making financial results correspond with the actual situation by means of withdrawing unutilized monies and, in this way, no debts remain; it would seem that there are no consequences.

We are not excluding the expediency in certain circumstances of redistributing in a centralized manner a part of the monies of cost accounting enterprises. But such measures have to be regarded as extraordinary (for example, the decision made at the July (1978) Plenum of the CC CPSU to write off the indebtedness of a number of kolkhozes which had gotten into a difficult financial situation). Compliance with the legal norms of financial relations between cost accounting enterprises and associations and the state budget is, in our view, no less important for increasing economic efficiency than the stability of production plans. It is generally known that there are instances of an inefficient expenditure of financial means, especially at the end of the year, because of the fear that unutilized monies will be withdrawn from enterprises. The instability of financial relationships undermined cost accounting and weakened material stimulation and, for this reason, in the 12 July 1979 decree of the CC CPSU and USSR Council of Ministers it is especially stated with respect to material stimulation funds: "Unutilized remainders of funds are carried over to the following year and are not subject to withdrawl." (1, pg. 46)

Let us consider, finally, what influence is exercised by the financial results of credit relations in foreign economic relations on the efficiency of social production. The income part of the state's summary financial plan (balance) adduces the total receipts from the repayment of previously extended credit to foreign countries, the interest on this credit, and credit extended by them to our country during the year. The expenditure part has the amounts of the repayment of previously extended credit by foreign states, the payment of interest on it, and credit to foreign states. The balance of the above items shows either an increase in foreign debt during the year, or a decrease in it.

With other conditions being equal, an increase in foreign debt means that in a given year a number of goods which are a part of national income or are a condition for its production have been obtained "gratis"; that is, without the enlistment of additional resources. An increase in indebtedness leads to an increase in the amount of utilized national income, since thanks to it exports decrease, or imports increase. But a decrease in foreign debt means that under the same conditions the amount of national income has been achieved with a smaller amount of resources, or that this national income which has been used for consumption and accumulations could have been greater by the amount of the credit paid off by

our country and extended by it to other countries. The efficiency of social reproduction, calculated without taking account of the financial results of credit relations in foreign economic relations, turns out to be either overstated if the amount of foreign indebtedness has increased, or understated if this indebtedness has decreased.

Thus, there has to be a specific correction of the overall efficiency indicator in connection with the financial results of credit relations in foreign economic relations.\*

It should be kept in mind that forthcoming payments and receipts do not coincide with the amounts included in the state's financial balance which was discussed above. It does not present the total amount of agreed upon loans, but only the amounts on these loans which have actually been obtained or paid out during the year, or (for the planning balance) payments and receipts which are forthcoming in the planning year. Financial resources which have been enlisted and diverted during the year are measured against one another in the balance. This is sufficient for purely financial balancing and determining current ability to pay. However, a substantial part of the credit has a long-term character connected with agreements on the construction of major projects in which investments and the return on them occurs over a period of a number of years. So-called compensation agreements in which the payment for credit which has been extended for the construction of industrial enterprises is made through output the deliveries after the completion of construction have become quite widespread in the practice of foreign economic relations. Terms of this type for the repayment of credit are employed both in the construction by our country of industrial objects in other countries, and with the receipt of credit for construction from foreign countries. In the first case, funds which

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\*While the question of taking account of the financial results of credit relations in foreign economic relations when the efficiency of social production is calculated is still a subject of discussion, for calculations of the efficiency of foreign trade it has already received a solution. In accordance with the methodology approved by Gosplan USSR in 1968, there is a special section — "Calculations of Economic Efficiency in Connection with Foreign Trade Carried Out On Credit Terms." In this section it is directly stated that "in calculations of the economic efficiency indicators of foreign trade carried out on credit terms it is necessary first to adduce to a single moment of time expenditures for production and currency receipts from exports, and currency expenditures and expenditures for the domestic production of goods which replace import goods." (7, p. 15)

have been extended for construction abroad do not receive compensation for several years, while in the second funds are received without visible expenditures.

In this way, an increase in the balance of forthcoming payments and receipts is a financial result of credit relations in foreign economic relations which should be taken account of in calculating the efficiency of social production. An increase in foreign indebtedness (or forthcoming receipts) is characterized by credit repayment periods, interest rates, and other repayment terms. In order to include forthcoming payments and receipts in the efficiency calculation they should be adduced to a given period of time in the same way as was done with respect to domestic indebtedness. The formula for the efficiency of social production (1) will in this case be corrected in connection with the financial results of credit relations in foreign economic relations as follows

$$\Omega_i' = \frac{S - D_i^*}{R}, \quad D_i^* = D^* \left( \frac{1 + \beta_3}{1 + a_3} \right)^{l_3}. \quad (5)$$

or

$$\Omega_i' = \Omega(1 - k_3), \quad k_3 = \frac{D_i^*}{S},$$

Where  $\Omega_i'$  -- is the economic efficiency of social production, including the influence of the financial results of credit relations in foreign economic relations;  $D^*$  -- is the amount of increase of foreign indebtedness during the year;  $D_i^*$  -- is the increase in foreign indebtedness adduced to the calculation year;  $\beta_3$  -- is the average interest on credit;  $a_3$  -- is the discontinuity coefficient;  $l_3$  -- is the average credit repayment period.

In the calculations in accordance with (5) foreign indebtedness has to be represented in domestic prices so that their results can be measured against the results of domestic production. A recalculation of payments and receipts in rubles for currency exchange rates could lead to substantial distortions. For a recalculation of this kind use can be made of import and export equivalents which take account of differences in the buying power of currencies and more accurately characterize the relationships between domestic and foreign trade prices. (7, p. 18)

The real amount of forthcoming payments or repayments depends upon the prospects for increasing or decreasing prices for output, and the currency exchange rates of payment in relation to gold or other currencies, which, correspondingly, increases or decreases the real amount of forthcoming payments or receipts. In order to avoid the influence of changes in rates of exchange on the amounts of payments which have been calculated in a specific currency, use is made of the so-called "gold stipulation"

which means that the real amount of payments calculated in gold remains unchanged when there are changes in the rate of exchange of a currency in relation to its gold content. In compensation agreements, as a rule, the amount of output deliveries in physical terms is agreed upon. These agreements can be concluded on condition that there are previously established prices for the output which serves for the repayment of loans, and on the condition that the loan is repaid with output at world market prices in effect at the moment of delivery. In the latter case a possible change in the prices for this output will lead to a change in the amount of payments. The above-mentioned factors have to find a reflection in the discontinuity coefficient.

Let us in conclusion cite an overall efficiency formula that takes account of all of the above-considered factors of balance.

$$3' = \frac{S}{R}(1-k_1-k_2-k_3). \quad (6)$$

The above methods of evaluating the influence of balance and proportionality on efficiency do not exhaust all of the aspects of the complex problem being discussed. In essence, this is an evaluation of the direct influence of the above-named factors. However, we must also be mindful of their indirect influence which can be expressed by an effect that is not fully obtained as a result of imbalance and disproportions. For example, we know how great the importance is of balance for the normal functioning of the entire economic mechanism, which is a highly important factor of the efficiency of social production.

Balance and proportionality exercise a serious influence not only on economic but on social efficiency. The 12 July 1979 decree of the CC CPSU set the task of a greater orientation by plans toward the accomplishment of social tasks. (1, pg. 4) A correspondence between material coverage and income would lead to the elimination of shortages and, consequently, of lines, thereby increasing the free time needed for the comprehensive development of the individual. With balance it would be possible to put an end to speculation and other negative phenomena which are caused by the existence of "shortages."

Of course, from a social point of view the methods of achieving a balance between income and material coverage are not of equal value. For example, its coverage by means of expanding the sales of alcoholic beverages which provides additional budgetary income and has the effect of lowering labor productivity, creating truancies and other social troubles, and, consequently, reducing real efficiency. The income from the sale of

tobacco products will hardly cover the additional expenditures for health care which are connected with treating people who abuse smoking. Such methods of achieving balance are, in our view, unacceptable. And, moreover, there is no need to resort to them with the level of the development reached in our economy.

An improvement of proportionality and balance should promote an increase in efficiency. All of the necessary preconditions exist for this. As Comrade A. N. Kosygin states: "The great scientific and technical and economic potential which is characteristic of developed socialism, the enormous experience which has been gained by our economic executives, and the increased political and labor activeness of Soviet people are creating new possibilities for achieving the necessary proportionality and balance in the development of our economy.

It is important here for the content of the balance of the economy and for planned proportions to be organized on the basis of a highly efficient use of resources and a correct selection of priorities and of ensuring dynamic structural changes in the economy." (A. N. Kosygin, "An Important Stage of Improving the Planned Management of the Economy," KOMMUNIST, No. 12, 1979, pp. 21-22)

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## ECONOMIC POLICY, ORGANIZATION , AND MANAGEMENT

### PLYSHEVSKIY DISCUSSES PROPORTIONALITY CONCEPT

Moscow PLANOVYE KHOZYAYSTVO in Russian No 5, May 80 pp 103-112

[Article by Dr of Economic Sciences B. Plyshevskiy: "On Proportionality of the Economy in the Period of Developed Socialism."]

[Text] At each stage in the development of the socialist economy a determinate system of economic proportions takes shape, related to the conditions of economic construction and the socio-economic tasks that are being solved. The formation of these proportions presumes a level in the growth rates of production and national welfare corresponding to the given state. A specific correspondence of growth rates and proportions of economic development can be clearly observed, for instance, in the years of the pre-war five-year plans, the post-war period, and the 1960's and 1970's. A number of new features in the mechanism of social reproduction have arisen with the 1980's.

Before we go on to examine trends coming to the forefront in this area we shall briefly turn to some methodological questions. In an investigation of proportions, an analysis of their changes over time in branch and territorial breakdowns, of the causes which produced these changes, of the conformity of the actual correlations to those intended by the plan, of current and comparable prices, of the international division of labor, and so on is significant. An analysis of this type defines the particularities of the operation of the objective economic laws of socialism in concrete historical circumstances and their application in the practice of planned management of the national economy.

A task of no lesser importance and, I submit, of much greater complexity is the determination of the laws and regularities underlying changes in the system of economic proportions over comparatively longer periods of socialist economic development.

Marxist-Leninist economic science, by generalizing from the experience of socialist construction in the Soviet Union and the member countries of the CEMA, has substantiated the general laws and regularities of the systematic planned restructuring of the proportions of social reproduction during the transitional period from capitalism to socialism and the initial stage of

victorious socialism, during the consolidation of the socialist economy and the ensuing entry of society into the period of developed socialism. The Soviet Union entered into this period at the beginning of the 1960's.

The results of the 8th, 9th and 10th Five-Year Plans contain a substantial volume of data for a constructive working up of the problems of economic proportionality in the developed socialist society.

At the same time these results are not unambivalent for the purpose of revealing the regularities of changes in the proportions of reproduction. They give evidence of new progressive trends and of shortcomings in the building up of the economy during the preceding years.

In the scientific literature the proposition has found general acceptance that the economy of developed socialism, in contrast to the preceding stage of socialism constructed in its foundations, has its own type of expanded reproduction--a type which is primarily or comprehensively intensive.<sup>1</sup> At the present time this type has not yet fully taken shape: many of its features mentioned in the literature rather have the character of normative or desirable requirements which have not yet been incorporated into practice.

Until now theory expresses to a significant degree notions on what proportions of expanded reproduction are indispensable in the developed socialist society and what these proportions ought to be. The main issue, however, is to strengthen the substantiation of paths and methods of transition to the desired and most expedient type of development. Economic science and economic practice is directed towards these issues by the decisions of the 24th and 25th congresses and the ensuing plenums of the CPSU Central Committee, in which the main issues of the long-run economic strategy of the party for the present stage have been formulated.

A large step forward in the formation of the proportions of reproduction of developed socialism should be achieved in the 11th Five-Year Plan. The preparation of the new five-year plan in organic unity with the basic directions of economic and social development of the country up to 1990 will permit a more tangible conception of the prospective structure of the national economy and the concretization of the immediate tasks of the work on the improvement of the entire system of economic proportions.

With the entry of our country into the period of developed socialism large changes have occurred in the process of expanded reproduction. The orientation of the development of production towards the solution of social tasks and the raising of national welfare has been strengthened. In each successive five-year period there has been an increase in the scale of the social undertakings that were implemented and which step by step covered ever wider strata of the population and new aspects of the daily life of our people. In the 9th Five-Year Plan the outlays on these measures were as large as in the preceding two plan periods. A huge social program is being realized also in the 10th Five-Year Plan.

The stabilization and increase of the share of the consumption fund in national income has reversed the tendency prevailing in the past of a decline in this indicator. The share of the increment of the consumption fund in the increment of national income utilized rose from 64 percent in the 8th Five Year Plan and 84 percent in the 9th Five-Year Plan to 75.6 percent in 1976-1978 (at prices of the corresponding years).

The strengthening of the interconnection between the growth of production and the growth of national welfare has shown up especially strikingly in the increase in resources allocated to the development of agriculture. During the 13 years since 1965, agriculture received 73.3 percent of the total volume of capital investments allocated to this sector during the entire period of Soviet power. The share of investment in agriculture (including the full range of agricultural work) in the total volume of investment on the national economy has risen from 19.8 percent in the 7th Five-Year Plan to 26.4 percent in the 9th and 27 percent in 1976-1978. The rise in the growth rates and the increase in the scale of capital construction in the countryside and in the volume of deliveries of agricultural technology and other producer and technological goods to collective and state farms has permitted a substantial strengthening of the material-technical base of the agricultural economy, and on these foundations a forward movement on the road to overcoming the socio-economic distinctions between the city and the countryside and to transforming agricultural labor into a variety of industrial work.

Significant success has been attained in solving a problem of such importance as that of housing. In 1966-1978, 1,383.1 million square meters of housing space has been built, or 42 percent of the housing space put into operation in the entire period of Soviet rule. During this period, 142.6 million people have received new apartments or have improved their housing conditions, i.e. more than 60 percent of the population at the mid-point of the 1960's.

We may mention two main qualitative aspects which indicate the development of other sectors ensuring growth in national welfare: the basic completion in the middle of the 1970's of the transition to universal secondary education of our youth, and the process, which in essence was only begun in the 8th Five-Year Plan, of industrializing the sphere of services--the creation of a modern system of every-day services for the population in the majority of towns and rural localities.

In speaking about the specific features of the reproduction process in the developed socialist society, mention must be made of the extensive factors which earlier had in many respects contributed to the maintenance of high growth rates of the economy. The slowing of the growth of labor resources, capital investment and primary fuel and energy resources and raw materials has created a principally different situation with respect to the sources of further growth of output. The essence of the changes which have arisen here again lies in the need to replace the reduction in the quantitative growth of resources by an improvement in their quality and an increase in efficiency, assuring thereby the dynamism of economic development which is indispensable for the solution of the social tasks.

The highest absolute increments of labor resources were attained in the 9th Five-Year Plan. From the midpoint of the 10th Five-Year Plan these increments declined only relatively, but also absolutely. The latter is mainly linked to the fact that in this period the young people born in the 1960's, when the second decline in the birth rate since the Great Patriotic War occurred, have been entering working age. The number of births per 1,000 inhabitants fell from 24.9 in 1960 to 18.4 in 1965 and 17.4 in 1970. The materials of demographic prognosis show that the influence of the wave of declining birth rates caused by the after-effects of the war will be observable throughout the 1980's and will begin to weaken only in the next decade.

The reduction in the increments to the number of workers in consequence of reduced birthrates has a temporary character and does not need to be considered a law-like regularity of the reproduction of the labor force under the conditions of developed socialism. At the same time there exist other factors causing a certain slowing of the growth of labor resources which do operate with constancy. In the first instance one must invoke here the high share of labor resources employed in the national economy (more than 90 percent) which was reached by the end of the 1960's and, related to this, the exhaustion in most regions of the country of such sources of labor force increase as the transfer of labor power from domestic employment and private subsidiary farming into the social production sector. Owing to this, any increase in the number of workers is for the present and the prospective future basically defined by the natural growth of the population.

The general conditions of reproduction in the developed socialist society are conditioned to a large degree by the slowing trend in the growth of capital investment. Thus, if in the 8th and 9th Five-Year Plans the volume of investment increased by 43-42 [sic] percent in relation to the preceding five-year plan periods, in the 10th Five-Year Plan the increase was set at about 26 percent. In this connection the absolute increments in capital investment declined from an annual average of 5.8 billion rubles in the 9th Five-Year Plan to 4.8 billion rubles in the years 1976-1978.

In noting a certain declining trend of the quantitative growth of capital investments and labor resources it is necessary, however, to see the differences between the regularities underlying the two instances. Capital construction is subject to direct planned management to an immeasurably greater degree than the reproduction of labor resources. If the growth rate of the labor force is affected primarily by long-run demographic processes, the main role in the determination of the growth rate of capital investment falls to the planned regulation of the growth rate of the economy and to the distribution of national income between accumulation and consumption.

The slowing of the growth rates of reproduction in the last years should in our opinion not be considered an inherent characteristic of the present development period of the economy as a whole. Basically it has been caused

by factors of a transitory nature, the unfavorable influence of which can gradually be overcome. As noted at the November (1979) plenum of the CPSU Central Committee, there are in the national economy substantial possibilities and reserves for the acceleration of the growth rate of production through efficiency gains and improvement in the qualitative indicators.

Increases in the growth rate and absolute increments of capital investment can be attained above all through raising the growth rate of national income. A change in the proportions of its allocation in favor of accumulation must in our opinion be assigned a subordinate role, since the relationship of accumulation and consumption in the developed socialist society is affected by the strengthened social content of the plans, their aiming at the growth of national welfare.

The factor of forced growth of capital construction at the expense of constrained growth of the consumption fund has historically exhausted itself in the periods of industrialization and post-war economic reconstruction. Today the tasks of the growth and qualitative improvement of the country's productive potential must be solved subject to stability in the overall proportions between accumulation and consumption, with the admission of a decline in the share of the productive accumulation fund for the sake of a supplementary increase of consumption resources only in individual years.

The conditions of developed socialism do not abrogate the principles of an optimal allocation of national income between the current needs of society and the requirements of expanded reproduction which were formulated by the party as early as at the inception of the first five-year plan period.<sup>2</sup> This refers both to the thesis stating the dependency of the planned growth of production on the rate of growth of accumulation and to the conclusion that large-scale long-run tasks of ensuring the growth of national welfare cannot be solved by means of cutting back on the scale of accumulation and capital construction. The main theoretical complement which the experience of the contemporary period contributes consists in that today the balanced growth of production, consumption and accumulation depends to a much greater degree than during the years of socialist industrialization on an acceleration of scientific and technological progress and on the mobilization of the reserves of efficiency gains in production and capital construction.

Another specific feature of reproduction under the conditions of the developed socialist society is a slowing in the growth of fuels and primary raw materials drawn into economic turnover. The causes of this are twofold. On the one hand, the reduction noted earlier in the growth rate of capital investment has to be kept in mind. Insofar as extractive industry and agriculture belong to the most capital-intensive sectors, a deceleration in the growth of the overall volume of capital investment is reflected directly in the scale of new construction in these sectors. In extractive industry, in addition, compensatory expenditures on support of the achieved volume of output will be increasing in the long run if expanded reproduction of fixed assets is not accompanied by an increase in output.

On the other hand, the development of a number of extractive sectors is constrained by the reduction in the last few years of the expansion potential of the mineral and raw material base. The 1970's were in this respect on the whole particularly favored years, as during that period the rapid commissioning of rich gas and oil deposits took place. For the next few years we cannot really reckon with the opening up of any large new fuel and energy sources, though for the long-run this possibility is not excluded. A deceleration is being noted also in the growth of the output of some other important raw material sources.

At the present time and in the future an ever greater influence on the development of the extractive sectors will be exerted by the accelerating transfer of the extraction and processing of fuels and raw materials into the eastern and northern regions of the country. In the course of the last three five-year plans, the bulk of the increment in oil and gas production was obtained in Western Siberia.

The increase of the role of the eastern regions in assuring the requirements of the national economy for fuel and energy resources as well as for many types of raw and other materials signifies an intensification of the influence of the factors of rational location of productive forces on the sectoral and territorial proportions of reproduction. The movement of these forces to the east brings with it large changes not only in the fuel, energy and raw material balance, but also in the structure of accumulation and in the labor balance. Together with the mineral and raw material base, capital construction is being shifted into the new regions, and the requirement for additional labor resources is also growing there, for which the main sources are located, as before, in the European part of the country.

For the resolution of this objective contradiction we need a development in the east at above-average rates of the branches of the investment complex (construction industry, specialized heavy machine-building serving the requirements of capital construction and the mining and extractive branches, construction materials industry) and the redistribution of the missing labor resources from the western regions, the European part and the Urals into the regions indicated. In parallel with the methods that have been applied to force capital construction in the newly developing regions and to draw in additional numbers of workers in a planned way, substantial importance in the solution of the tasks deriving from the above belongs to such relatively new plan levers for attaining proportionality as the freeing of labor resources in the existing industrial enterprises in historically developed industrial centers and a better coordination of the number of newly created working places with the real sources of labor supply in the individual regions.

The process of reproduction in the extractive sectors confirms, as the experience of the recent years shows, the differential rent theory of K. Marx on the simultaneity of the exploitation of better, more richly endowed deposits of minerals with the utilization of relatively less productive sources.

Both aspects reflect technical progress, the application of the achievements of modern science in production. For the theoretical elaboration of the contemporary proportionality problems in socialist reproduction it is of importance that these be properly taken into account.

The deterioration of extraction conditions noted in the economic literature does not by any means relate to all types of mineral resources and can in our opinion not be considered a general tendency. A massive volume of data indicates that many new deposits are characterized by larger productivity and smaller production expenditures. What is increasing, as a rule, is transport expenditures and outlays on infrastructure, housing and social-cultural construction which are connected with the initial opening up of new sources. But even in this case the possibility exists to compensate the increase of outlays on the opening up and preparation of new deposits by a complex utilization of their output and, in consequence, by an increase in labor productivity.

Apart from the effect of objective factors, the deterioration of the development conditions of the extractive branches and the rise in the costs of fuels and raw materials is reinforced by the tendency of a part of the economic managers to justify exaggerated requisitions for capital investments and supplementary materials and financial resources and to pay insufficient attention to the improvement of the planning and organization of production and work. There also appears to be at work a lack of objective data on the real dimensions of the cost increases which have occurred, a transfer to these costs of various types of non-productive expenditures and outlays.

New elements have been contributed to the process of expanded reproduction and the development of its proportions by the reconstruction of the economic mechanism. Thus, in the 8th and 9th Five-Year Plans industry and construction were transferred to new conditions of planning and economic incentives, and thereafter also the other sectors. Much work has been performed on the improvement of management methods in agriculture.

In conformity with the changing make-up of the productive forces, the rights of ministries, councils of ministers of union republics, enterprise and production, scientific-production, all-union and republican industrial associations formed in many branches were expanded at the same time as centralized planning was strengthened. On all levels of management economic methods of business management were significantly improved and the cost accounting system obtained further development.

In consequence of the changes mentioned, the ministries, republican management organs and production and industrial associations gained a substantially increased influence on the development of the reproduction proportions.

The organizational principles of the economic system of developed socialism have been legislatively consolidated in the USSR Constitution which defined the general directions of improvement of the economic mechanism and the

and the development of its democratic foundations. Practical tasks in this sphere, which were mentioned in the decisions of the 25th Party Congress, have been given concrete form in the July (1979) decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality." The measures contained in this decree are to be realized in the 11th Five-Year Plan period.

In this manner expanded reproduction in the developed socialist society provides evidence of the fundamental transformation of the structure of production and the system of proportions of the national economy (relations of the sources of economic development, of branches and regions, of means of production and objects of consumption, etc.) with the aim of a more complete assurance of social requirements. A large role in this process is played by the mastering of new factors of output growth by means of raising the efficiency of utilization of material and labor resources and natural wealth, and its main organizational lever is the improvement of the planning system, the economic incentives and the administrative structure. The interrelation of these directions of practical work on the improvement of the planned management of social reproduction processes determines the concrete forms for the manifestation of the economic laws of socialism, including the laws of reproduction and of their conscious utilization in the interest of society.

The results of the last three five-year plans testify to enormous achievements in the solution of the key tasks of the party's economic strategy. Among the fundamental results of this period we must count above all the continuous growth of the economy, the consolidation of its scientific-technical and production capacity, and the unceasing increase of the standard of living of the Soviet people. Thus, the productive fixed assets of the national economy increased from 1965 to 1979 almost 3-fold, the national income (utilized) 2.1-fold, industrial output almost 2.6-fold, and agricultural output by 38 percent. Retail turnover grew more than 2.4-fold, and real income per capita of the population by 88 percent.

The unified national-economic complex of the country has become more powerful and productive. The strengthening of the industrial character of the economy is corroborated by the increase of the share of industry and construction in the production of the social product. In the structure of industrial output the share of progressive sectors--electricity generation, chemical and petrochemical industry, machine-building and metal processing--has grown 1.5-fold.

Qualitatively new levels have been attained by complexes of interconnected sectors--the fuel and power complex, the construction material production complex, and those of machine-building, agro-industry, construction, and the transport and communications system. The employment of mechanized technology has expanded also in trade and in the sphere of services.

A substantial increase was registered in foreign economic ties, especially in the 1970's. In 1966-1978 the 2.1-fold growth in the volume of foreign trade (which compares to a 1.37-fold increase during the preceding three quinquennial) exceeded the increase of national income. The expansion of a foreign economic ties, in parallel with the strengthening of cooperation on a planned basis with the socialist countries in the framework of the CEMA and the development of socialist economic integration, was based also on the establishment of mutually beneficial economic relations (trade, scientific-technical cooperation) with the industrially developed capitalist countries which became possible thanks to the relaxation of international tensions.

The inclusion of the Soviet economy into the system of international division of labor proceeded mainly through an expansion of the export of fuels and industrial raw materials and of the purchase on international markets of machines and equipment, some raw material goods, foodstuffs and other mass consumer goods. In result there has been an increase in the role of foreign economic ties in the development of the sectoral structure of production within the country and in the formation of the material composition of national income utilized and the simple and expanded reproduction funds.

At the same time the process of socialist reproduction in the period under review was accompanied by certain difficulties and contradictions in the reconstruction of economic proportions. In addition to objective causes, factors of a subjective nature made themselves felt here. At the November (1979) Plenum of the CPSU Central Committee it was noted that ministries and departments did not everywhere successfully overcome the forces of inertia and carry through decisively the redirection of all work towards quality, the raising of labor productivity and the attainment of better final results, and that the USSR Gosplan did not resist with all due force the pressures of departmentalism and localism which weaken the strength of the plan and interfere with the proportional growth of the economy.

In the analysis of the dynamics of reproduction, our attention is drawn to the lowering of growth rates and, in the 10th Five-Year Plan, some decline in the absolute increments of national income, industrial and agricultural output, the commissioning of fixed assets, retail turnover, and other important economic indicators. The average annual increase of national income utilized in 1976-1979 came to 3.8 percent.

This reflects above all the nonfulfillment of the plan tasks for raising the efficiency of social production. Thus, in industry the increase in output attributable to labor productivity growth, which had risen from 73 percent in the 8th Five-Year Plan to 84 percent in the 9th, amounted to 75 percent in 1976-1970. The decline in the rate of return on assets at the level of the national economy accelerated in the 9th Five-Year Plan in relation to the preceding period. In the current five-year period it is not slowing down. In the 1970's the prevailing tendency has been a rise in material intensity.

The nonfulfillment of the tasks for efficiency growth has prevented the full realization of the measures to improve the proportions of the national economy. The gap between the growth rates of the "A" and "B" [producer goods vs. consumer goods] groups of industry has again increased: whereas in the 8th Five-Year Plan the output growth rates of the two subdivisions became practically equal, in the following 10 years the growth rate of consumer goods production was one-fifth lower than that for producer goods. In result the production of mass consumption goods lagged behind the increase of money incomes and of the effective demand of the population, and we did not manage to strengthen the economic incentives for labor productivity growth and the improvement of the quality of work in the production collectives to the necessary degree. Nor was the structural factor for raising economic efficiency fully utilized--that of efficiency gains through accelerated growth in the sectors of the second subdivision, to which substantial significance was assigned in the five-year plans.

A contradictory influence on the efficiency of production was exerted by the above-average development pace of the group "A" sectors of industry. A faster growth of these sectors, other things being equal, normally creates the possibility for accelerated scientific-technical progress and economies in the expenditures of labor and material production resources. This regularity of the reciprocal relations between changes in the structure of industrial production and the growth of economic efficiency is observable also in the period under analysis. It is observable in particular in the increase of the share of progressive sectors in the composition of industrial output which was noted earlier, the effect of which was realized not only in the sphere of producer goods production, but also in agriculture, capital construction, transport, and in light and in the food industry--in all sectors where the new techniques and technology were put to use. However, the reciprocity relations referred to were weakened by disproportions which arose in the development of the basic branches of heavy industry, capital construction and railroad transport. Since the middle of the 1970's the growth of industry and the national economy as a whole is being held back by deficits of rolled ferrous metals for machine building and construction, of fuels, specific types of raw materials, timber and construction materials, by the nonfulfillment of tasks for the commissioning of new productive capacities in a number of sectors, and also by shortcomings in the development of railroad transport--the exhaustion of the feed-through capacity of the roads on the freight-congested lines from the European part of the country to the Urals, the Siberian regions and the Far East. A reenforcement of the state of balance in heavy industry and the branches of construction and transport connected with it has therefore become the basic condition for an efficient development of industry and the entire economy.

The ways to overcome the bottlenecks and disproportions in the national economy have been substantiated in all-around manner in the decisions of the November (1978 and 1979) Plenums of the CPSU Central Committee. These decisions go beyond the current economic problems and present a program of action for the next five-year plans and for a longer perspective. In the

1980's, as L. I. Brezhnev noted in the speech at the meeting with the voters of the Baumanskiy election district of Moscow, the redirection of our entire economy towards intensive development, the raising of efficiency and quality, and care for the ultimate results of economic activity, a redirection which was begun in the last decade, must be continued and completed. This most important matter constitutes the pivot of the economic strategy of the party.

In the materials of the last plenum of the CPSU Central Committee and the statements of L.I. Brezhnev important theoretical instructions are to be found on ways for attaining a balanced development of production under the conditions of its intensification. First, these statements stress the raising of efficiency and quality as the main means for assuring proportionality. In the past the main attention has often been turned towards increasing the volume of production without sufficient concern for the technical level and quality of the output produced. The consistent realization of the economic policy elaborated by the party requires from the planning organs the preparation of proposals which will increasingly reduce the practice of balancing resources with requirements by means of an extensive expansion of production.

Second, the role of economies of material and labor resources in securing an efficient proportionality of the economy must be strengthened. This presumes that plans take more fully into account reserves for raising the efficiency of production by means of a better utilization of the output produced and a reduction of losses and waste, especially with respect to energy, fuels, metals, timber, construction materials and agricultural raw materials. Substantial attention was directed at a reduction of expenditures norms for the most important types of mineral resources in the production process and, prior to that, in planning. At the present time the significance of this work is growing, in connection with the rise in the scale of production and the change in the development conditions of the extractive and raw-material branches. An ever larger part of the additional requirements of the national economy for material resources must in the long run be covered by means of economies, both reducing the requirements themselves and the output increments necessary for satisfying them.

Third, an effective instrument for improving the proportions of the national economy and the balance in the development of production and capital construction will be a better utilization of the existing production capacities, of the production potential which has been created. This is dictated not only by the increasing scale of the national economy and the factors of deceleration in the growth of capital investment which have been mentioned, but also by the new possibilities for raising the effectiveness of enterprise work which have been created by the scientific-technical revolution.

Corresponding changes are taking place in the directions of utilization of the accumulation and capital investment fund. The construction of new enterprises will be restricted primarily to the raw material and extractive branches and to the formation of new branches and productions, whereas the main form of expanded reproduction in processing industry will be the expansion, technical reequipment and reconstruction of existing enterprises.

The appropriateness of a priority allocation of capital investment to raising the technical level of existing production is confirmed also by the fact that for a number of years relatively high growth rates of fixed assets have been accompanied by a deceleration in the retirement rate of obsolete technology and a decline in the share of new assets [in the aggregate stock of fixed assets]. In industry, for instance, where depreciation norms have been reduced, the retirement rate of fixed assets declined from 2.1 percent in 1965 to 1.4 percent in 1978. The expansion of reconstruction work, as a more effective form of expanded reproduction in respect of expenditures and outlay pay-off periods, will permit a more rapid overcoming of this unfavorable tendency which does not correspond to the task of accelerating scientific-technical progress.

An improvement in the proportions of the national economy is attained also by the mastering of methods for planning current production and capital construction as a single whole on the part of all-union and republican state planning organs, ministries and departments. Component parts of this approach, in addition to the line of raising the share of reconstruction, are provisions in the plans taking account of the large possibilities existing in a number of branches to raise output in newly commissioned enterprises and investment objects (through reductions in the time periods allowed for the attainment of the technical-economic indicators of the project, the assurance of labor supplies, material-technical resources and transport to these enterprises, the elimination of bottlenecks of various types) and to raise the shift coefficients in existing enterprises.

It follows that the transition to a primarily intensive type of expanded reproduction is linked to the improvement of the entire system of material and value proportions, the point of departure being the implementation of the tasks of the long-term economic strategy of the party. To all appearances this will take up a relatively extended time period, the length of which depends directly on the qualitative resolution by the central planning organs of the development problems of the national economy in the new five-year plan." L. I. Brezhnev stated, "enormous changes in the structure and proportions of the economy must be effected, the established branch and territorial links must be perfected, and those linkages must be revealed where at the price of minimal outlays the largest effects can be rapidly obtained. All of this the USSR Gosplan--the highest planning organ of the country--must think through profoundly, analyze quantitatively, and translate into the language of concrete plan tasks and figures."<sup>3</sup> Upon this also will depend to a large degree, within what time periods the measures for the improvement of the economic mechanism aimed at by the decrees will be fulfilled.

#### FOOTNOTES

1. These questions have been reviewed, in particular, in the works of G. M. Sorokin and A. I. Notkin, "Zakonomernosti rasshirennogo sotsialisticheskogo vosproizvodstva" [Laws and Regularities of Expanded

Socialist Reproduction], Moscow, Nauka, 1977, chs 1 and 2; "Ekonomika razvitoogo sotsialisticheskogo obshchestva (osnovnyye cherty, zakonomernosti razvitiya)" [Economics of the Developed Socialist Society (Basic features, Development Laws)], Moscow, Ekonomika, 1977, section 6.

2. See "Direktivy po sostavleniyu pyatiletnogo plana narodnogo khozyaystva" [Directives for the Establishment of the Five-Year Plan of the National Economy] in "KPSS v rezolyutsiyakh i resheniyakh s'ezdov, konferentsii i plenumov TsK" [The CPSU in Resolutions and Decisions of Congresses Conferences and Central Committee Plenums], 8th Edition, Vol 3, Moscow, Politizdat, 1970, p 504.
3. Brezhnev, L. I. "Rech' na Plenume Tsentral'nogo Komiteta KPSS 27 noyabrya 1979 g." [Speech at the CPSU Central Committee Plenum of 27 November 1979], Moscow, Politizdat, 1979, p 21.

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## PLANNING AND PLAN IMPLEMENTATION

### INCORPORATING ANNUAL PLANS INTO FIVE-YEAR PLANNING

Moscow PLANOVYE KHOZYAYSTVO in Russian No 6, Jun 80 pp 15-23

[Article by P. Krylov, deputy chief of department of Gosplan SSSR: "Annual Plans in the System of Five-Year Planning"]

[Text] One of the important directions of planning improvement lies in the realization of the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 "On Improving Planning and Strengthening the Action of the Economic Mechanism on Raising Efficiency of Production and Quality of Work" in connection with establishing a correct interrelationship of annual plans to five-year plans on the basis of the fact that the five-year plan constitutes the chief form of planning the economic and social development of the country and the basis of organization of operational activity.

At the same time, annual plans are important elements of the general system of state planning. The main task in working them out is to ensure the fulfillment and overfulfillment of the targets of five-year plans. For this reason even the First Five-Year Plan presented the most important targets of the five-year period in the context of annual plans. The organization and methods of annual planning have undergone significant development.

At the present time, five-year plans contain all the basic targets; a number of most important balances are likewise worked out and approved in an annual context. But in the planning practice of recent years there has been a lack of coordination between targets of five-year and annual plans. Beginning with the third and fourth years of the Ninth and Tenth Five-Year Plans, the annual plans of many sectors and of the national economy as a whole have significantly deviated from five-year targets on the side of reduction.

Such a situation has come about mainly for two reasons: because of objective difficulties in the course of fulfillment of the five-year plan and defects in the organization and methods of planning. The first includes first of all consistent nonfulfillment of capital-construction plans, especially with regard to making production capacities operational and the extended

periods of making them operational. In a number of sectors plans for making production capacities operational are fulfilled by only 70-80 percent or less. Significant difficulties in the fulfillment of annual targets of the five-year plan for the production of consumer goods were connected with inadequate deliveries of agricultural raw material due to unfavorable weather conditions significantly affecting crops in 1975 and 1979.

A basic defect in planning has been an imperfect balance of a number of fundamental indicators in intermediary years of the five-year plan. Thus for separate years of the Tenth Five-Year Plan requirements were not completely satisfied for ferrous-metal rolled products and needed reserves of material resources were lacking for a number of consumer goods. The inadequate balance of a number of targets of the five-year plan was due to a narrow group of developed material balances and the absence of developed financial plans.

Dispersion of funds on numerous projects has had a negative effect on the fulfillment of the five-year plan by years. The total number of industrial construction projects accomplished with state capital investment for the 1978 plan was 40,000, including 10,200 construction projects, or 25 percent, that were newly started. Because of insufficient material resources and capacities of construction organizations, beginning with the third year of the Ninth and Tenth Five-Year Plans, it was necessary to reexamine the plans of capital investment for the national economy as a whole and for a number of very important sectors. The correction of capital-construction plans resulted in reduction of manufactured products compared to the targets of the five-year plan, especially for the fuel and raw-material sectors.

But despite all these difficulties, annual plans have served as the means of putting into practice the basic directions of the national economy's development and raising the living standard of the people as provided by the decisions of the 25th CPSU Congress. The decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 outlines a number of major measures for eliminating the above-mentioned defects and establishing the essential unity of annual plans with five-year plans. The most important of these measures are the following:

transition to a stable five-year plan of capital investment;

significant development of balance work;

increasing economic stimulation and raising responsibility for the fulfillment of five-year plans on the basis of employment of a system of stable economic norms;

boosting the cost-accounting role of the five-year plan on the basis of conclusion of five-year economic contracts;

evaluation of the fulfillment of the five-year plan on all levels of economic management by means of the cumulative total since the start of the five-year plan.

The decree of the CPSU Central Committee and the USSR Council of Ministers defined the role, tasks and procedure of working out annual plans of economic and social development. It is pointed out in the decree that annual plans must be compiled on the basis of the targets and economic norms of the five-year plan for the given year and provide for the introduction of the newest achievements of science and technology as well as for the implementation of economic and organizational measures ensuring the fulfillment of the five-year plan.

It was established as a general principle that indicators of the annual plan must be no lower than the corresponding annual targets of the five-year plan. Fulfillment of this task is based on the whole system of the above-mentioned measures aimed at bolstering the validity of five-year plans and the creation of conditions for their successful fulfillment. The most important of these is the establishment of stable five-year limits of capital investment on whose basis putting into operation production capacities and projects of social-cultural construction as provided by the plan must be assured. Henceforth volume of capital investment must not be set in annual plans, but annual targets of the five-year plan for putting into operation production capacities and fixed capital may be made more precise (adjustments, however, must not significantly deviate from the targets of the five-year plan).

A most important factor for the successful realization of five-year plans is the significant development of balance work, especially expansion of the range of material balances and a more complete development of financial balances. At the same time, the reliability of all types of balances will be increased through the formation of necessary reserves. The latter should be provided for all of the most important factors of economic development in plans of capital investment presented by USSR ministries and councils of ministers of union republics to enterprises and organizations. Of particular big importance will be the existence of reserves of the most important types of raw and other materials and fuel. At the present time, the concrete sizes of these reserves have been established for 1981-1985.

One of the chief difficulties of ensuring uniform fulfillment of annual targets of the five-year plan is the presence of significant deviations from targets for the production of agricultural products, which is confirmed by the data presented below according to years of the Ninth and Tenth Five-Year Plans:

(in percent of previous year)

1971--101.1	1976--106.5
1972-- 95.9	1977--104.0
1973--116.1	1978--103.0
1974-- 97.6	1979-- 96.0
1975-- 94.7	

Results differed still more for the production and purchases separate varieties of agricultural crops. In the determination of annual targets of the five-year plan for agriculture, they proceed from average weather conditions for a number of years and in annual plans--chiefly from harvest sizes in the current year of the five-year plan.

With the strengthening of the material-technical base of agriculture, development of irrigation and land reclamation, improvement of seed growing, conditions are created for securing more stable harvests of the basic agricultural crops. However, a certain unevenness in the production of agricultural products will remain in the immediate future, although it will decrease. Taking this into account, it is necessary to provide corresponding reserves in the plans.

An important prerequisite of successful fulfillment of five-year plans should be uniform fulfillment of plans for the development and introduction technology, which determines to a significant degree introduction of production of new progressive types of products, increased production output and also improvement of the most important indicators of production efficiency. At the same time, up to the present time, targets of five-year and annual plans for the development and introduction of new technology have been fulfilled 80-90 percent at many ministries and departments.

The decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 also provided a number of measures for increasing the responsibility and economic interest of enterprises, organizations, ministries and departments in the successful fulfillment of annual targets of five-year plans.

The chief of these consist in the introduction of a system of economic norms for the wage fund and economic-stimulation funds. In the use of such norms in the case of establishment of annual plans below the targets of the five-year plan, the sizes of the wage fund and economic-stimulation funds are reduced correspondingly and conversely in the overfulfillment of targets of the five-year plan, the given funds will be increased.

It should especially be noted that together with an increase of economic interest, the responsibility of ministries, departments, enterprises and organizations increases for the fulfillment of targets of the five-year plan. Of important significance for this is the introduction of responsibility for the fulfillment of economic contracts concluded between suppliers and users for the five-year period. State responsibility for the fulfillment of the five-year plan in annual plans is strengthened by the fact that in case of nonfulfillment of five-year targets by individual ministries or by union republics, they must especially report this to the USSR Council of Ministers.

Gosplan SSSR has been granted the right to return to ministries and departments for further work drafts of plans that do not meet the tasks set in

in the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979. This also applies to the requirement of obligatory fulfillment of the annual targets of the five-year plan.

An important prerequisite of successful fulfillment of annual targets of five-year plans is improvement of their technical-economic validation. This applies especially to five-year plans with yearly breakdowns for production associations and enterprises, inasmuch as in consolidated data for ministries and union republics a number of deviations connected with the influence of scientific-technical progress, changes in production structure and the like are mutually canceled out. Greater technical-economic validation of five-year and annual plans is needed on the basis of systematic use of the system approved by Gosplan SSR of progressive technical-economic norms and standards according to kinds of operations and expenditures, the use of data of passports of production associations (enterprises) and introduction of the practice of assessment of the intensiveness of plans.

The role of annual plans in providing for the fulfillment of targets of the five-year plan can be seen from the following. Annual plans are accompanied by a comprehensive system of measures relating to the fulfillment of the five-year plan both as to quantitative indicators and as to production efficiency indicators. Much work is being done in finding labor-productivity growth reserves and reserves for the economy of material and financial resources and in putting into production new products of high quality. The successful realization of the annual targets of five-year plans depends on well organized control over their fulfillment. The main thing here is to provide a thorough analysis of the reasons responsible for the lag in fulfilling five-year plans and to develop corresponding effective measures for overcoming the defects.

The content of annual plans with strengthening of their unity with five-year plans must be fully reflected by the entire national-economic complex. For this reason there should be defined in annual plans for the national economy as a whole general economic indicators characterizing the rates and proportions of development of the national economy and of the rise of the living standard of the people, growth of the country's national income, the general rates of development of industry and its basic sectors, the increased volume of agricultural production, size of commodity turnover, housing and social-cultural development and also basic national-economic proportions.

A careful balance of economic proportions must be an important task in the development of annual targets of the five-year plan as well as of annual plans.

The center of gravity of work in annual plans is shifted to concretization of material proportions because a detailed products list will be established in them of industrial products and their distribution. Concretization of annual targets of five-year plans must also be done for other sectors of the

national economy, including for freight turnover of transport, for putting production capacities into operation and for putting into operation facilities of the nonproduction sphere, the plan of development and introduction of new equipment and individual indicators of social development.

The scale of concretization of the plan of industrial production in annual plans can be seen by the fact that at the present time the products list of the plan of industrial production in annual plans comprises more than 4,000 designations of products whereas in the 11th Five-Year Plan it is intended to work out about 1,000 positions. Correspondingly, the schedule of material balances in the 11th Five-Year plan is designated in the amount of 400 kinds versus 2,000 in the annual plan.

It should be taken into consideration that the products list of the production plan as well as the material balances in the 11th Five-Year Plan have been expanded compared to the 10th. But in the annual plan as opposed to the five-year plan, a significant products list by types, forms and brands of products is approved by Gosplan SSSR (about 3,000 designations).

A more detailed list for the manufacture of products and material balances in annual plans permits the establishment of concrete interconnections and proportions among separate sectors of industry and the national economy. Thus, a products list of trucks and tractors permits the establishment of a tie between machine building and construction, agriculture and motor transport of general use and so on. On the basis of a detailed schedule of products in annual plans, yearly targets of five-year plans may also be refined for total volumes of production of separate kinds of products and so may the product mix delivered on the basis of economic agreements.

Of most important significance in development of plans are questions of raising production efficiency--growth of labor productivity, yield on capital, reduction of production cost, increased profits. Careful substantiation of such indicators must be provided first and foremost in five-year plans. This is determined by the fact that only within a perspective of several years is it possible to take fully into consideration the effect of scientific-technical progress, changes in production structure and measures for improving the management and organization of production. One of the chief tasks of annual plans should be ensuring the fulfillment of five-year targets for growth of production efficiency and finding additional reserves of economy of material, labor and financial resources.

The decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 pays much attention to active participation of labor collectives in the development of five-year and annual plans and in the exercise of control over their fulfillment. It has been provided for the compilation of an annual plan to begin from below—from production associations (enterprises) and organizations. At the same time, drafts of plans of associations and enterprises must be developed on the basis of launching of socialist competition and use of inhouse reserves as counter plans, exceeding

the targets of the five-year plan for the corresponding year. The development of counter plans on the basis of five-year targets is now being practiced since the 10th Five-Year Plan, but this practice has still not received its due development. Under the new conditions, counter plans should become an important form of participation of collectives of enterprises in the working out of annual plans under the condition of their careful validation and requisite coordination with material resources as well as of the needs for the products of the given sector. Economic stimulation of enterprises which have adopted counter plans is provided for by a significant increase for them of norms of deductions into funds of economic stimulation.

With the 11th Five-Year Plan, firm time periods are introduced for the compilation of annual plans. Gosplan SSSR has to prepare a draft of the annual plan of economic and social development of the USSR no later than four months before the start of the year. The concrete time periods of working out drafts of plans for all parts of economic management and also the time periods for examining and approving a plan by directive organs must proceed from the fact that the approved annual plans for all indicators reach associations, enterprises and organizations not later than one and a half months before the beginning of the planning year, that is, before 15 November. For the observances of the above-indicated time periods, it is necessary to significantly cut down on the time of development and approval of annual plans for all levels of administration.

At the same time, it is necessary to adopt effective measures for strict adherence to the time periods of presentation of draft plans to Gosplan SSSR by all parts of economic management, ministries and republic councils of ministers. One of the chief defects contributing to the impairment of development of plans is noncomprehensive presentation of separate sections of a plan. As a rule, the times of presentation of separate sections of the plan stretch out from two weeks to a month.

Ensuring the reduction of the time of compilation and therefore of presentation of annual plans would contribute to smoother operation of enterprises and construction projects and the use of the freed time for verification of plan fulfillment and the working out of necessary measures for this.

A significant feature of the development of annual plans under the new conditions is that there is no longer a need for working out of control figures for annual plans. The annual targets of the five-year plans will serve as control figures for annual plans. But in the case of occasional significant deviations, the determination of their effect on the development of related sectors is required, including the effect of production capacities that are made operation and the anticipated harvest of agricultural crops.

The 1981 annual plan is being worked out in coordination with the main directions of social and economic development for the 11th Five-Year Plan. Indicators of the development of the national economy for 1981 will serve as

an ingredient of the new five-year plan. At the same time, while taking into account the broader range of a number of indicators of the annual plan, its development is provided as a separate planning document.

Taking into consideration the enhanced role of the five-year plan, the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 establishes the system of indicators approved in five-year and annual plans. While retaining unity of indicators of the five-year plan and the annual plan, a broader range of separate targets is established in the five-year plan for production associations, enterprises and organizations.

Annual plans now do not stipulate limits to state capital investments, targets for reducing the use of manual labor, separate indicators of the technical level of production and the most important forms of production output.

Only five-year plans specify approval of norms of pay per ruble of product and norms of distribution of profit, formation of funds of material reward, social-cultural measures and housing construction. It means that in annual plans targets and norms for pertinent indicators will be used in sizes set by annual targets of the five-year plan.

Even greater differences have been provided for approved indicators in five-year and annual plans developed for industrial ministries. The basic principle of these differences lies in the fact that for the majority of economic indicators their approval by the USSR Council of Ministers will depend on whether or not the corresponding annual targets of the five-year plan are fulfilled.

If the targets of the five-year plan are fulfilled, the indicators for production volume, growth of labor productivity, production of products of the highest category of quality, targets for the introduction of new equipment and other indicators are approved by the industrial ministries themselves on the basis of the targets (or norms) of the five-year Plan. Along with increasing the role of the five-year plan, such an approach means a significant expansion of the rights of ministries and departments in the forming of the annual plan.

It is also provided that certain economic indicators, including volume of sold production, total sum of profits and also the wage fund (in sectors for which a norm of pay per ruble of production has not been set), are approved by USSR industrial ministries themselves, but with the agreement of Gosplan SSSR and for republic ministries with the agreement with gosplans of union republics. The practice of coordination of individual indicators instead of their approval by the USSR Council of Ministers creates conditions for more flexible regulation of the indicated indicators in the annual plan depending on the planned structure of production output and material outlays.

While taking into account the aforesaid, the list of indicators approved in annual plans for industrial ministers fulfilling the targets of the five-year plan is limited by the following:

production output in physical terms, including products for export (according to a detailed products list);

putting into operation fixed capital, production capacities and facilities, including growth of capacities owing to reequipment and modernization of existing enterprises;

payments into the state budget and allocations from the state budget;

delivery volume of material-technical resources needed for the fulfillment of the annual plan.

This group of approved indicators makes it possible to provide in the annual plan a concrete product mix of manufactured products, permits planning of expanded reproduction and determines the material resources required for production as well as the financial results of the development of sectors in the form of economic interrelations with the state budget.

In case of nonfulfillment of targets of the five-year plan, USSR ministries and departments, union-republic councils of ministers and Gosplan SSSR present for the approval of the USSR Council of Ministers all the economic indicators and indicators of the plan of development of science and technology for a given sectors. Reduction of the group of approved indicators in the annual plan by no means signifies rejection of the development of a single coordinated annual plan. Only a comprehensive approach to the annual plan makes it possible to provide a balance comprehensive development of the national economy. It should be taken into consideration in this connection indicators of development of individual sectors approved higher by ministries than those of the five-year plan as a rule are also in need of coordination, taking into account the need of additional resources of raw and other materials and power. For this reason calculations of the annual plan for the full range of indicators of the five-year plan are needed for the determination of generalizing indicators for the tempi and proportions of development of the national economy, which according to the draft of the annual plan will in some measure diverge from the corresponding targets of the five-year plan both owing to projections for individual sectors and also because of changing basic data.

A basic feature of the forming of the annual plan for a number of economic indicators under the new conditions is that for ministries fulfilling and overfulfilling the five-year plan their indicators will be given consideration in the annual plan in sizes by USSR ministries and departments themselves and union-republic councils of ministers and for ministries not fulfilling five-year targets, the existing practice of review by Gosplan SSSR and approval by the USSR Council of Ministers of indicators of annual plans will be retained. But even for ministries fulfilling annual targets of five-year plans, economic indicators may be in need of refinement with account being taken of the projections of the annual plan for production

output in physical terms and for putting into operation production capacities and facilities.

The decree of the CPSU Central Committee and the USSR Council of Ministers makes significant changes not only in the development but also in the assessment of the fulfillment of five-year and annual plans. At the present time, the assessment is made for the most part on the basis of data on the fulfillment of targets of individual years of the five-year plan compared to the yearly targets of five-year plans and of the annual plan on the basis of quarters.

Beginning with the 11th Five-Year Plan, a single principle is introduced of evaluating the fulfillment of both five-year and annual plans by means of cumulative totals from the beginning of the five-year period or the beginning of the year, respectively. Such an assessment makes it possible to characterize more objectively the fulfillment of targets for the entire planning period.

The assessment of fulfillment of the annual plan has in mind systematic tallying of the cumulative total both for physical and cost indicators. Such a method directs associations and enterprises to compensate for nonfulfillment of the annual plan for the past quarter in subsequent periods. In quarterly assessment in cases of overfulfillment of plan in the quarter, it is not taken into account in subsequent quarters, although it serves as an indicator of successful ahead-of-schedule fulfillment of plan targets.

Implementation of the principle of assessment of fulfillment of annual plans by means of the cumulative total requires systematic verification of plan fulfillment for three, six and nine months and for the entire year. At the same time it is advantageous to retain quarterly reporting for the basic indicators of the plan for analysis of the smoothness of its fulfillment compared to data of prior years.

Much attention is paid in the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 to strengthening of plan discipline. The task has been set of providing for the stability of annual plans approved by production associations (enterprises) and organizations and not allowing correction of a plan in the direction of reduction under the actual level of its fulfillment.

The existing practice of mass correction of plans, persisting despite a number of instructions of directive organs, weakens responsibility and the struggle for the fulfillment of plans on the part of enterprises and local organs, results in mechanical equalizing of well and poor operating enterprises and is responsible for major breakdowns of intersectorial ties and economic proportions.

The scale of correction of plans at the end of the year can be judged by the number of enterprises not fulfilling the plan for 11 months and for the year.

Year	Number of Enterprises Not Fulfilling Plans (thousands)	
1977	4.2	1.9
1978	4.4	1.9
1979	6.6	2.8

For a large number of the indicated enterprises, the plan was corrected in December by ministries and departments themselves.

The use of administrative and economic sanctions provided by the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 must result in sharp curtailment of the correction of annual and quarterly plans beginning with the 11th Five-Year Plan.

All of the aforesaid testifies to the significant changes in the practice of the development and organization of the fulfillment of annual plans for the purpose of successful accomplishment of five-year plans of economic and social development. A number of questions relating to the compilation of annual plans are still in need of more work with account being taken of the experience of work, including such important questions as reflection in annual plans of special purpose complex programs and exercise of control over indicators approved only in five-year plans, and a number of others.

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## INTRODUCTION OF NEW TECHNOLOGY

### ACADEMICIAN DISCUSSES MANAGEMENT OF TECHNOLOGY

Moscow PLANOVYE KHOZYAYSTVO in Russian No 6, Jun 80 pp 45-54

[Article by V. Glushkov, academician of the USSR Academy of Sciences:  
"Management of Scientific and Technological Progress"]

[Text] One of the characteristic features of the contemporary stage of scientific and technological progress consists in a fundamental change in the methods of managing it. Today an increasing number of scientific and technical problems have to be solved by the more progressive parallel method which is different from the so-called classical sequential method. The latter is used within narrow branch dimensions and is based on the scientific and technical level which has been achieved in other branches. The management of scientific and technological progress is simplified here, but its rates are sharply reduced, since a new stage is not begun until the previous one is completed.

The situation is aggravated by the fact that sequentiality is preserved within the branch also: First scientific research work is performed, then experimental designing work, then the pilot model of the new equipment is created and tested, then the technological adjustments and the production of the model in a small series takes place, and, finally, there is its mass introduction (frequently achieved in a slow evolutionary manner). Of course, all of these stages are necessary; however, as theory and practice show, many operations could and should be performed simultaneously in order to move from slow evolution toward the preparation and realization of qualitative leaps.

The parallel method of managing scientific and technological progress was used, for example, in carrying out the atomic and missile programs. Experimental designing work was performed without waiting for the complete conclusion of scientific research work, and the designing and construction of plans for the shift to mass introduction began long before the completion of work on creating and testing pilot models.

Similarly, although on a much smaller scale, the development and introduction of the first domestic management computer, the "Dnepr," was carried out. Less than three years passed from the idea to the beginning of the large series production of the machine. The preparations for production (the reorganization of the plant and the retraining of its personnel) began before the full completion of scientific research. The experimental model was created simultaneously with the reorganization of the plant, and small series production was started shortly after the creation of the experimental model. With the help of the stationary "Kiev" computer, experiments were conducted on managing various production processes (in metallurgy, chemistry, machine building) at a distance. During the course of these experiments experience was gained, the mathematical support was prepared, the effectiveness of the machine was discovered and, most importantly, people were trained.

Depending upon the scope of the work, the introduction of parallel methods of managing scientific and technological progress substantially increases the workload on management agencies. If one or two operations have been shifted to such methods, the necessary quality of management can be achieved by a simple redistribution of forces in the different elements of management, directing them primarily toward these operations. But for a mass shift this method is unacceptable. The solution of the problem in this case is only possible with a fundamental reorganization of the conditional system of planning and management on the basis of a wide use of computers and paperless information means which make it possible to expand the flows of data in accordance with the increased workload on the managerial agencies through sharply reducing the number of documents.

The purpose of the parallel method of management consists in uniting the efforts (with the help of computers) of the organizers of scientific and technological progress: from the individual scientists, designers, planning workers, and production engineers to Gosplan USSR and the State Committee for Science and Engineering. It is important to emphasize that we are speaking about a fundamentally new method of planning and management which includes the reorganization of not only the technical base, but also of methodology, organizational forms, indicators, and stimulation systems.

A draft variant of this method was developed back in the 1960s. After the 24th CPSU Congress a great deal was done to realize its individual elements, above all, its lower-level ones. The Institute of Cybernetics of the Academy of Sciences of the Ukrainian SSR prepared and introduced systems for the overall automation of planning and designing work on the basis of paperless information which promoted a material decrease (from 2 to 3 to 20 to 30 times) in designing period and an increase in the quality of the designs. Automation systems for equipment tests

are also based on the principles of paperless information. Their introduction made it possible to shorten the time by several times and to increase the quality of tests.

Many systems of models and programs for higher levels of the management of scientific and technological progress have also been tested. However their introduction is being held back by the fact that the present methodology and organization of management, above all, the special-purpose program methodology, is not adapted to them.

Although the decision to shift to overall special-purpose programs of the management of scientific and technological progress has been made and is regarded (formally) as fulfilled, in fact, such a shift (if we exclude certain special programs) has not occurred. The same plans for scientific research and experimental designing work which are presented by ministries still exist, but they are called overall special-purpose programs.

A state overall special-purpose program has to solve not narrowly departmental problems connected with the development, for example, of a new model of a passenger car, but much larger problems such as the placing of passenger transportation on a definite technical and economic level. It is oriented toward the accomplishment of tasks connected both with the creation of new types of cars and with their operation and servicing (the construction of roads, garages, the organization of preventive maintenance, repairs, and so forth) and contains a complex of social and economic problems.

An exact determination of the social and economic results which the state will receive from carrying out one or another program is very important. Programs should include all of the stages of the "science-production" cycle (right up to the mass introduction of new scientific and technical achievements). The correct organization of the management of the process of its formation and execution is of great importance for the success of any program. First of all, it is necessary to have a director who possesses the appropriate rights which ensure him the possibility of interbranch management right up to the temporary shifting of the subordination to himself of individual subdivisions of enterprises and organizations, regardless of their departmental membership. For each such subdivision it is necessary to pose a clear task and to establish control over its accomplishment and the official acceptance of the results of its work. The program director has to be allocated specific monetary and material resources which he has to distribute among executors.

The performance of these duties is only possible with the creation (temporary) of a center for the management of the program. Mathematical models of it on the basis of network schedules have been sufficiently well studied both in theory and in practice. In accordance with the general principle of paperless information, this center should work with a minimum of documentation. A generalized network schedule should be organized on the basis of the network schedules of co-executors in an automated manner with a minimum of manual work. But the primary network schedules (for the most minor sub-goals of the program) should be made up at the appropriate stages of the planning: in the draft plan in detail for the work on the technical plan and in less detail for the subsequent stages (the working plan, the preparation of production and so forth). The technical plan should include as the component part a detailed network schedule of the stage of the work plan, and so forth. The simultaneous carrying out of the stages requires, correspondingly, the simultaneous preparation of the management schemes for the subsequent stages.

For a maximum economy of manual labor the development of the management schemes should be conducted (like all the planning as a whole) in an automated manner with a maximum use of existing prototypes (which are kept in automated electronic archives). The normatives for labor and material expenditures are, as a rule, not worked out completely anew, but are computed as a result of the refinement of the prototypes.

In contrast to the existing procedure, the technological normatives for the actual manufacture of the elements being designed (machinery, buildings, roads, and so forth) should be created (with a subsequent continuous refinement) at the earliest stages of planning, beginning with the technical assignment. This is the chief condition for scientific long-term planning. With the rapid rates of scientific and technological progress, in ten years (not to speak of longer periods) the normatives change so significantly that in principle they cannot be obtained on the basis of existing statistics. And the use of purely statistical norms will inevitably lead to resource disbalances and, correspondingly, to a slowing down of the rates of scientific and technological progress.

Since the management schemes (network schedules) and the normatives are continuously being corrected, the center for the management of the program has to be connected with the centers for the management of the co-executors of paperless information flows and have the possibility of managing them. The management scheme on the basis of network schedules does not amount solely to the task of finding the critical path. It embraces a system for the optimization of work which is performed within the framework of a given program on the basis of constantly refined

information. The possibility of anticipating the receipt of such information makes it possible to plan and carry out various kinds of correcting measures. For example, if it is discovered at the stage of the draft planning of objects that the total expenditures of metal for their realization appreciably exceeds the orientation norm which has been established in the technical assignment it is possible to attempt to lower them at the stage of technical planning.

The development of plans for such corrective measures is a difficult engineering and economic task. It has to be accomplished with the help of the center of the management of the program and the head institute which is at the disposal of the program director. In addition, in the formation of such plans there has to be close contact with Gosplan which conducts in accordance with a special system (which is briefly described below) a continuous balancing of the resources which are expended for the fulfillment of the different programs. It is in this system that the possible deficits of resources are determined and ranged by magnitude and, consequently, the priorities of the measures to economize them.

As for the degree of definiteness in the different stages of the program, at each given moment they can be at various stages of its fulfillment. Whereas at the stage of mass introduction or of the construction of projects on the basis of finished plans it is possible and necessary to have a fixed scheme of the forthcoming work with sufficiently proven normatives, at the stage of the beginning of scientific research it is, as a rule, premature to speak about this. Instead of a clear normative network schedule of the forthcoming work, in this case it is preferable to have a normative special-purpose forecast.

The methodology for such forecasting which was proposed by the author of this article in 1969 has now been successfully tested within CEMA first on a bilateral and then on a multilateral basis. It has been adapted for operation in the system of managing scientific and technological progress being described at the earlier stages of the creation of overall special-purpose programs. As with the subsequent stages, the forecast is organized and performed by the center for the management of the head institute's program. First of all, on the basis of an order from superior managerial agencies, the head institute refines and coordinates with the client the goal which can be achieved with the help of the program being formed: for example, to achieve an additional annual production of one trillion kilowatt hours of electric energy without increasing expenditures of coal, petroleum, and gas. At this stage, the resource expenditure ceilings for the realization of the program are not yet even fixed approximately. We are speaking only about a forecast of different variants of schedules and ways of achieving the goal, and also of the expenditure of resources in these variants.

The meaning of the methodology consists in a sequential (from the final goal) unfolding of sub-goals. If the goal has been clearly formulated, a collective of experts (3 to 15 people) who represent the basic schools and opinions is created for its realization. Each of them is obliged to define the necessary time periods and resources in the event that some of the intermediate goals (formulated by himself) have already been attained. With these conditional evaluations the expert remains within the limits of his competence, providing the possibility for other experts who have a better knowledge of these matters to evaluate the time periods and ways of achieving the intermediate goals which are being set by him.

The methodology makes it possible to bring together the different opinions of experts. As a result, the probability evaluations of the time periods and ways of achieving the goals appear. In accordance with the general requirements of paperless information, the forecast is constantly in the computer's memory, and with a change in the experts' opinions is rapidly recalculated. This kind of dynamism is a mandatory requirement for all scientific and technological forecasts. Without it, as a result of the continuity of the development of science and scientific and technical possibilities, a forecast rapidly becomes obsolete and not only does not help, but sometimes harms things.

The given methodology envisages the management of the forecast on the basis of constant work with experts at organizing additional scientific research and other measures. This management is directed at a consistent refinement of the forecast and the punctual elimination of unpromising variants in order to obtain in the final analysis not a forecast schedule, but a network schedule of a corresponding program for a period of five to ten years. As a byproduct, the task of determining the co-executors is accomplished and the formulation of their work assignments is refined. This makes it possible to reduce to a minimum the efforts connected with working out schemes for the management of the programs.

As has already been noted, the management schemes embrace all of the stages of the program, including the construction and reconstruction of enterprises and the organization of mass production on a new technical basis. This concluding stage demands the greatest expenditures of material resources and, consequently, the closest coordination with the balanced calculations in the system of long-term planning. Even in the event that the management scheme for the concluding stage is already at the level of a forecast, the methodology provides probability evaluations of the time periods and resources necessary for the realization of this stage, and also of the technological normatives for the new production base being created as the result of the fulfillment of the

program. In other words, all of the necessary information exists for the performance of the appropriate balance calculations.

In 1973 the author proposed a system of models of dialogue planning ("Displan") which solved the problem of practical optimization of long-term and short-term plans on the basis of a coordination of the special-purpose program and balanced methods of planning. This is a fundamentally new system which embraces the most important sections of the plan. It operates with an actually planned (at the level of Gosplan) products list of output and with actual types of fixed capital and labor resources which are calculated in the plans. For any assigned planning period  $T$  the special systems of service programs for the Gosplan computer, by working up information on the plans for commissioning capacities, the training of cadres within the framework of the special-purpose program, and also on existing capacities and labor resources, determine the vector  $b_T$  of the amount of capital-hours and man-hours. The capital intensive and labor intensive normatives  $b^{(T)}_{ij}$  for  $n$  -- the types of output being calculated ( $i = 1, \dots, m$ ;  $j = 1, \dots, n$ ) are calculated for the resources in question. In this way the matrix  $B_T$  equals  $b^{(T)}_{ij}$  arises for the given planning period  $T$ . In the same manner, a matrix is calculated of the direct expenditures of different types of output for the production of one unit of each planned type of output.

Further, as the result of the working out of network schedules for the special-purpose programs there appear the vectors  $C'_T$  and  $b'_T$  of the full expenditures (during the period  $T$ ) of output and resources (capital-hours and man-hours) for the fulfillment of the program. As a result of the processing of requisitions for the delivery of output to satisfy final extra-economic current (extra-program) needs, the vector  $C''_T$  of the extra-economic extra-program final consumption during the period  $T$  arises. Like all of the remaining vectors being calculated, its components are given in the positions of the real national economic plan. In addition, for concrete positions different units of measurement (fiscal and monetary) are used. And, in the event of necessity, the special service programs bring about a rapid recalculation from certain systems of units to others.

By putting together the vectors  $C'_T$  and  $C''_T$  of program and extra-program final consumption and by making the usual addition of exports and subtraction of imports (and also the balance of changes in state stocks), we obtain the vector of final consumption  $C_T$  which includes, in particular, the entire situation of the capital construction and reconstruction of enterprises. Through a solution of the system of linear equations  $X - A_T X = C_T$  we find the vector  $X = C_T'$  of the necessary full production of output for the period  $T$ . The full expenditures

of resources (capital-hours and man-hours) which ensure the fulfillment of the plan are calculated in accordance with the formula  $d_T^* = B_T C_T^* + b_T'$ .

The difference  $d_T = b_T^* - b_T$  of needed and present resources determines the vector  $d_T$  of shortages of resources. Deficit resources correspond to components with a plus sign, while surplus resources correspond to components with a minus sign. With a deficit of resources the plan turns out to be unbalanced, that is, in essence, is not actually a plan. Its balancing consists in the working out of concrete proposals on changing individual sections which are aimed at decreasing deficits. Such changes may concern the structure of the individual positions in the plan (the relative proportions of output of different types in one or another average planning position), an economy of resources, the acceleration of commissioning schedules, new construction and reconstruction programs, a structure of foreign trade, and so forth.

Balancing is aimed first of all at decreasing shortages of resources. This work is performed not only in Gosplan, but also in the ministries, at enterprises, and at centers for the management of special-purpose programs. It is of fundamental importance that the concrete proposals to improve plans which have been formulated be received in the Gosplan Computer Center in paperless form through communications channels or on magnetic carriers. In this case the mathematical support of the "Displan" system will ensure the complete recalculation (rebalancing) of the plan for several thousand indicators in approximately ten minutes.

The purposeful formation and inclusion in the plan of proposals which improve it make up the essence of the practical optimization of the plan, which was mentioned above. The word "practical" emphasizes that not only general recommendations are worked out, but also concrete measures (for which concrete executors are responsible) for their realization. The most important measures in the system are measures connected with scientific and technological progress, the acceleration of the rates of introduction of progressive types of output, and the technology of producing it. Each proposal which is received here regarding such measures receives a current (within ten minutes) evaluation on a state scope (in the form of decreasing the shortage of the most deficit resources). At the same time, the plans for providing these measures at all steps with the necessary output deliveries -- right up to raw material -- are recalculated.

If the flow of proposals and active measures aimed at accelerating the rates of scientific and technological progress has dried up and the deficits have not been fully eliminated, then in order to obtain balance in the plan there remains the path of a sequential examination of the

proposals aimed at decreasing the number of positions of final consumption. And, on the contrary, if the shortages have been eliminated, and the stock of active proposals has not been exhausted, the possibility is created of increasing final consumption with each new such proposal. An important characteristic of the "Displan" is the direct inclusion (under the direction of Gosplan) in the process of planning of all of the people who possess real knowledge regarding the routes of scientific and technological progress and the necessary responsibility and possibilities to realize their proposals. This makes it possible to create an effective system of stimulating scientific and technical thought not only at the stage of its realization, but also at the stage of planning.

"Displan" makes it possible to conduct work on improving all types of plans simultaneously. For this reason, despite the seeming staticness of the planned optimization model which has been examined, it is in a definite sense more dynamic than the classical dynamic macroeconomic models. Its advantage (practical dynamism) consists in the fact that changes in economic indicators (the structure of capital and technological coefficients) are determined not abstractly, but on the basis of the aggregate of the real plans and programs for social and economic development.

With the application of "Displan" to territorial planning it becomes possible, for example, to evaluate and regulate the work of transportation, and also to work out special-purpose programs for its development. "Displan" is able to reflect the income and expenditure balances of the population, population migration, and other problems which comprise the basic content of social and economic development plans on a state level.

The presentation of plans in this dynamic form makes it possible to perform work on them continuously. This means, in particular, the continuous prolongation of plans. For example, a five-year plan, while retaining the ordinary period for its approval, moves forward (in the sense of the performance of all of the necessary calculations) upon the expiration of each year by one year. In this way, the flow of proposals which are aimed at accelerating scientific and technological progress in future plans begins to be studied and evaluated long before their actual approval. This makes it possible to effectively form the directions for scientific searches through anticipating the emergence of many difficulties which could be encountered in the final formation of the plan.

The continuousness of planning provides for the punctual correction of plans when there are major changes in a situation, particularly with the unexpected appearance of new scientific and technical possibilities.

It is very important that in "Displan" the full balance of plans is retained here with the mutually agreed upon corrections brought to all executors. As a result (in contrast to the ordinary unbalanced corrections), the fulfillment of such a plan will not encounter additional difficulties.

The system of continuous (dynamic) scientific and technological forecasting ensures the refinement, as a rule, not of the five-year and, especially of the annual, but of longer term plans. As for a twenty-year plan for social and economic development, its second ten-year period represents basically a plan of a forecasting nature and it will be formed in accordance with changes in the scientific and technological forecast.

A special characteristic of "Displan" consists in the fact that its flexible system of service mathematical support makes it possible to rapidly change groupings of output and plan indicators at any level of planning, including the top-most level. This circumstance is of fundamental importance for accelerated scientific and technological progress.

A sharp change in the proportions which have developed within one or another aggregated output as a result of the requirements of scientific and technological progress causes the disaggregation of the corresponding position (for example, of the total production of plastic, its various concrete types are singled out in individual positions). And, on the contrary, if the proportions which have developed in the different planning positions do not undergo important changes, they can be put into a single aggregated position. In this way, the types of output being planned are varied, while remaining within the assigned dimensions of the planning model. With economic growth and with an increase in the productivity of computers, these dimensions (the planned products list) should increase.

The methodology of planning and managing scientific and technological progress which has been described may seem excessively complex. However, it must not be forgotten that the existing methodology was developed under different historical conditions and was successfully used as an instrument for rapidly overcoming the technical backwardness of our country. But today it no longer corresponds to the level of the productive forces. A shift to a paperless form of planning and management is an urgent requirement of our time and a mandatory condition for accomplishing the task set by the party of combining the achievements of the scientific and technological revolution with the advantages of our social system and for realizing the measures mapped out by the decree of the CC CPSU and USSR Council of Ministers "On

**Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and the Quality of Work."**

An improvement of the system of scientific and technical information is of great importance for accelerating the rates of scientific and technological progress.

First of all, it is necessary to create a centralized service for the registration, formulation, and distribution among possible executors of the scientific and technical problems which arise. Such a service could expediently be created in the State Committee for Science and Engineering on the basis of an expansion of the All-Union Institute of Scientific and Technical Information and the VNITITSENTRA [expansion unknown]. The operating system informs a wide range of scientific and technical workers about new scientific and technical achievements. In addition to this, it is necessary to have systematic and punctual information regarding important unsolved problems of scientific and technological progress. Today there is no system here. Enterprises, designing bureaus, and scientific research institutes which encounter problems that they are not able to solve themselves seek possible executors, making use of their own (as a rule, very scant) information. As a result, many problems do not find executors (especially the best ones) and unjustified delays and duplications arise in the performance of assignments.

When they encounter one or another problem for which they have not been able to find executors themselves, enterprises, scientific research institutes, and designing bureaus send a requisition to the All-Union Institute of Scientific and Technical Information. The appropriate service verifies the novelty of the problem. If its solution is already contained in published works, patents, or reports, the information regarding this is sent to the client. New problems are given to the specialized scientific councils of the State Committee for Science and Engineering. There they are grouped and arranged by importance and after their formulations have been refined and they have been given identification numbers they are passed on for publication in special problem bulletins. The latter are sent to the appropriate institutions which present proposals on including certain problems in their thematic plans. With this method there is a great simplification of the drawing up of plans (it is sufficient to indicate the problem's number) and of the discovery of duplications. In addition, the client who has provided the problem becomes known to the executor. The State Committee for Science and Engineering has to carry out systematic work to ensure the punctual inclusion of all requisitions in plans and the elimination of duplications.

The rapid introduction of its achievements which requires the performance of two groups of measures is a very important task of the acceleration of scientific and technological progress. The first is to provide planning agencies at various levels with reliable information about the production capabilities of lower organizations, including known scientific and technical achievements. The most important of these measures is a strict regulation of information sources and a new organization of stimulation. The regulation consists in the personal assignment of various production sectors to the individual workers who carry out planning and norm setting. On the basis of information about the production capabilities of a sector different plan variants for its workload are developed in order to obtain the best technical and economic indicators when various scientific and technical achievements (suitable for the given sector) are introduced. At each of the succeeding levels of planning a variant aggregation of plans for larger sectors is performed. The principle of personal responsibility has to be observed here.

A payment procedure that takes account of seniority and of the organization of accurate and punctual planning information is established for all of the people who are members of such a hierarchical system. A special highly qualified control apparatus (consisting of approximately one-tenth of the planning personnel being checked) is created for the periodic sample checks of this information at all levels of planning. Its workers are provided with stimulation in a similar manner. Each check establishes not only the latest, but also all of the earlier (within a specific period) information which has been received from the element being checked.

When inaccuracies are discovered the guilty parties are completely or partially deprived of additions to their wages. If an error is established by the control apparatus of a superior agency, this measure is applied to the control apparatus and administration of the agency which has been checked. In this way, at any level of the system (and above all, at the level of upper administration) stimuli are created for the punctual discovery (and correction) of errors by its own control apparatus.

The maximum (with regard to scientific and technological progress) capabilities of the various production elements have to be used correctly. Toward this end, superior planning agencies have to plan not only for the capabilities which have been discovered, but also the technical and economic measures (with the appropriate resources) and specific reserves which are necessary for their realization. In the contrary case, losses will be much larger than the "under-harvest" from planned reserve creation.

The second group of measures to ensure the rapid introduction of new technology consists in the creation of an interest in enterprises at branches in this introduction. In part, this task is accomplished by the institution of stable expenditure normatives for a sufficiently long period of time (concretely for the five-year plan) in order for the additional economy which has been obtained as a result of scientific and technological progress to be used for the expansion of stimulation funds and the development of enterprises. However, stable normatives operate basically in "loss-free" measures and, moreover, such measures which can be realized in a relatively brief period of time and with relatively small expenditures. In the event that an introduction is connected with a risk and requires large expenditures and long periods of time, it is necessary to use various forms of risk insurance, advances, and even a partial compensation for the expenditures which are made.

It is simplest to do this through a special fund in the State Committee for Science and Engineering from which the costs of enterprises which are the first to introduce new technology are compensated. In the event of success the expenditures are compensated from the fund, and, moreover, the compensation is made in full and even with certain additional percentages if the introduction is unique. If, however, it can be repeated by other enterprises the compensation is applied to all of them. In addition, if there are secondary introductions the compensation of costs from the fund is made either on a smaller scale, or is not made at all.

An acceleration of the rates of scientific and technological progress is connected, as is known, with the punctual development of technology and preparation of production. Technological development has to begin at the very earliest stage of designing of new equipment models and have a decisive influence on the entire process of designing. Punctual preparations have to be made with the equipment, tools, and rigging for the future production of the products being designed. Today this work is frequently postponed until the stage of the mastery of the industrial production of the new products. As a result of this, the technical and economic indicators in the early stage are quite far from the optimum. There are large over-expenditures of labor, materials, and energy. In progressive branches there are frequent cases when the production of new products does not manage to keep up with the planned technical and economic indicators, since they rapidly become obsolete and have to be replaced with newer products. The rapid and high quality preparation of production demands a powerful means of production industry and, in particular, a tool production. Let us note in this connection that the division of industry into groups A and B which is customary with us is already being perceived in a somewhat different sense. It

reflects chiefly the division of industry into heavy and light industry. However, many of the products of heavy industry (for example, passenger cars which go for individual consumption) represent not means of production, but consumer articles. For this reason, this division does not reflect the true situation regarding the ratio between the means of production and consumer articles capacities of industry. The automation of experimental research, scientific and technical information, planning and designing work, and the testing of new equipment is a powerful lever for accelerated scientific and technological progress. In experimental research and the testing of new products automation accelerates the process from several times to several thousands times. Planning and the search for scientific and technical information is achieved dozens of times more rapidly. Correspondingly, labor productivity increases in the spheres of work and there is a sharp improvement of the quality of the results which are obtained.

An optimal management of scientific and technological progress has to use all of these levers in a balanced way.

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